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2.1 INTRODUCTION

This application for a SPPE is for the construction and operation of the Project. The Project will be owned and operated by the IID. IID is an irrigation district established under Division 11 of the California water code, Sections 20500 *et seq*. that provides electrical power, non-potable water, and farm drainage services to the lower southeastern portion of the California desert, primarily in Imperial County. IID's new Project is intended to serve the growing electrical load demands of the region (see Figure 2.1-1, IID Service Territory Map).

The Project will supply the internal power generation needs of the IID service territory during periods of peak electrical demand. The simple-cycle peaking Project consists of two General Electric (GE) LM6000 PD SPRINT NxGen CTG with inlet air chillers. The Project will be designed to produce 93 MW net electrical output with a heat rate of 9,464 Btu/kWH (HHV[1]) based upon annual average atmospheric conditions, having an ambient temperature of 72 degrees (°) Fahrenheit (F).[2] The Project Site will be located to the northeast of Niland, California, an unincorporated community located in Imperial County (Town of Niland). The Project Site is adjacent to IID's existing Niland Substation (see Figure 2.1-2, Project Location Map).

The Project is being permitted for combined annual operation of 6,400 hours (which includes 6,000 hours of power operation, 500 startups, and 500 shutdowns) for both CTGs.

As the local electric utility, IID's first obligation is to provide its customers with safe, reliable electric services at competitive rates. Imperial County and Riverside County continue to experience a steady growth in population, and as such, IID's load demand also continues to increase. This Project will provide several benefits for the electric customers of IID such as:

- Providing low cost, extremely flexible peaking generation capacity centrally located within the IID transmission system with the ability to serve both Imperial and parts of Riverside counties.
- Provide additional internal generation.
- Increase the overall efficiency of the IID generation resource portfolio.
- Adding highly reliable generation using proven technology.

The Project has limited natural gas and water linears, and has minimal impacts on resources and the surrounding environment. Therefore, the Project has been deemed to have no significant adverse environmental impacts provided the necessary Project-specific mitigations are properly implemented.

[1] HHV is the higher heating value of a fuel that considers the heat consumed by heating the water formed during the combustion process.

[2] All temperature data are from the Western Regional Climate Center for the Brawley station. This is the closest station to the Niland site.

2.2 SITE LOCATION AND LAYOUT

The Project Site is located northeast of the Town of Niland, California, on a Property owned by IID. The Property legal description is R14E, T11S, S3, NE ¼.

The Property is predominately undisturbed native soil and is relatively flat, having a gradual approximately 1 percent gradient from northeast to southwest. The elevation of the Property is approximately 105 feet below sea level (bsl). The total disturbed area of the Project and temporary construction areas will be approximately 26 acres. Permanent site improvements and features associated with the final Project Site will comprise a total of approximately 22 acres, which will be situated in the southwest portion of the Property adjacent to the existing Niland Substation. The Project Site includes: the power block; stormwater basins; stormwater interceptor trenches; protective berms; construction lay-down areas; related buildings and structures; and ancillary facilities (including water and gas metering stations). The remaining 4-acres of disturbed area will be associated with (1) temporary construction office trailers and parking located outside the "fence line" of the Project Site (this area will be returned to its original condition at the conclusion of the Project), and (2) underground water and gas laterals serving the Project. See Table 2.2-1, Estimated Disturbed Area, for a detailed breakdown of relevant Project Site acreages.

TABLE 2.2-1
ESTIMATED DISTURBED AREA

Project Component Item	Component Area	Component Length	Construction Right-of-Way (ROW)
Project Site – permanent features			
Power Island, Operation Parking and Access Road, Storm Water Retention and Detention Basins, Construction Laydown, and Gas Metering Station (Inside Project Fence)	16.0 acres	NA	NA
Interceptor Trench, Protective Berm, and Surface Grading Downstream of Detention Basins (Outside Project Fence)	5.6 acres	NA	NA
Project Site acreage	**21.6 acres**	**NA**	**NA**
Water Supply Line - underground	0.32 acre	700 feet	20 feet
Fuel Gas Supply Line	0.83 acre	1,800 feet	20 feet
Total Project acreage	**22.75 acres**	**NA**	**NA**
Project – temporary features			
Temporary Construction Area – Parking, and Construction Trailers (Outside Project Fence)	3.0 acres	NA	NA
Total Project disturbed area	**25.75 acres**	**NA**	**NA**

NA = Not Applicable

The southern half of the Property where the Project will be located is zoned M1U (Manufacturing Light Industrial), and the northern half of the Property is zoned A2 (General

Agricultural). Acceptable M1U zoning uses include "Electric Power Generation," although a Conditional Use Permit (CUP) from the Imperial County Planning/Building Department will be required for construction activities.

The existing IID Niland Substation is located in the extreme southwest corner of the Property. Water will be delivered to the Project Site via an 8-inch pipeline lateral from the GSWC's 12-inch pipeline, which crosses the northern half of the Property. A natural gas pipeline lateral along the southern boundary of the Property will branch off the nearby SCGC transmission lines, which run north-south along the eastern boundary of the Property. These features are described in more detail in the following paragraphs.

2.2.1 Site Arrangement

As indicated, the Project will be located in the southwest portion of the Property, adjacent to the existing Niland Substation (see Figure 2.1-2, Project Location Map). The two CTG trains are aligned along an east-to-west axis within the Project Site (see Figure 2.2-1, General Arrangement). In consideration of the prevailing winds from the west, and to minimize any potential exhaust plumes or recirculation, the stacks are located at the east end of each CTG, aligned along a north-south axis. The distance between the stacks is approximately 135 feet, with the south stack located approximately 325 feet from the south property boundary and approximately 850 feet from the west property boundary. The administration building is located directly to the east of the CTG trains.

A new generation switchyard will be built on the west side of the CTGs. This switchyard provides a common place from which to interconnect the plant output to the existing Niland Substation.

Existing transmission lines extend out from the existing Niland Substation along the south and west sides of the property. An existing east-west distribution line, that runs along the south border of the Project Site, will be undergrounded for the portion that is adjacent to the Project Site.

Natural gas will be supplied to the Project Site from two existing SCGC parallel natural gas transmission pipelines running north-south along the eastern boundary of the property (Figure 2.1-2, Project Location Map). The transmission pipelines will be tapped immediately north of a regulating station that reduces the natural gas pressure of the transmission pipelines continuing south (while one of the natural gas transmission pipelines would be sufficient to supply the Project, both are being tapped to provide a highly reliable fuel supply). A buried natural gas lateral off of the transmission pipelines is routed west along the south side of Beal Road, turning north to a metering station located just outside the Project Site fence, along the east side of the Beal Road access to the Project. The east-west natural gas lateral will be approximately 1,800 feet long. The natural gas lateral will be designed, constructed, owned, and operated by SCGC. The design details of the lateral will be developed by SCGC.

The Project's minimal water requirements will be supplied via an existing GSWC buried 12-inch potable water main that runs diagonally from the northeast to the southwest, primarily across the northern portion of the Property (see Figure 2.1-2, Project Location Map). The potable water main will be tapped for an 8-inch service connection at the western edge of the Property (this service size is based on the higher onsite fire water reservoir replenishment requirement of approximately 500 gallons per minute (gpm), as compared to the very much lower operating need of approximately 40 gpm). The buried 8-inch water supply lateral is routed south, turning east to the meter and backflow preventer located in the northwest corner of the Project Site. The lateral is approximately 700 feet long and will be designed, constructed, owned, and operated by GSWC. The final design details of the lateral will be developed by GSWC.

The Project will be designed with zero liquid discharge (ZLD) from the Project Site. As part of the ZLD system, three new stormwater basins will be located along the south and west edge of the Project Site (see Figure 2.2-2, Site Plan and Utility Interface). The Project Site will include mechanisms to control surface flows during storm events, and provide a relief for potential water quality contamination, as described more fully in Section 6.13, Water Resources. One evaporation/infiltration basin will serve to collect the stormwater that falls onto the Project Site. The other two detention basins will serve to manage the stormwater from the remainder of the Property that would have otherwise flowed through the Project Site.

2.2.2 Site Access

There will be two permanent access points to the Project Site. The primary access to the Project Site will be from Beal Road near the administration building. The second access to the Project Site will be from the west side of the Property. Temporary construction access will also utilize the second access road. Construction trailers will be temporarily located west of the Project Site. The construction laydown areas will be located to the north of the CTGs inside the fence line. Construction parking will be temporarily located north of the Project Site (see Figure 2.2-2, Site Plan and Utility Interface).

2.2.3 Transmission Interconnection

The Project will interconnect to the 92-kilovolt (kV) bus at the existing Niland Substation. A new intermediate generation switchyard will be constructed to gather the output from the Project and provide a common point of interconnection to the Niland Substation (see Figure 2.2-3, Niland Substation One Line Diagram).

The interconnection between the generation switchyard and existing Niland Substation will be accomplished with an overhead interconnect line (see Figure 2.2-4A, Generation Switchyard General Arrangement, Figure 2.2-4B, Generation Switchyard Elevations Sheet 1, and Figure 2.2-4C, Generation Switchyard Elevations Sheet 2). An existing 13 kV overhead distribution line running along the north side of Niland Substation will be partially placed underground to allow for the interconnect line access Niland Substation.

Each CTG will have a dedicated generator step-up (GSU) transformer. The low-side voltage level will be 13.8 kV. Non-segregated bus duct will be used for the interconnection between the generator, switchgear module, and GSU transformer (see Figure 2.2-5A, Electrical Key One Line Diagram, Legend and Symbols, Figure 2.2-5B, Electrical Key One Line Diagram, and Figure 2.2-5C, Generation Switchyard Electrical Key One Line Diagram).

The high-side voltage level is 92 kV. Overhead cables will be used to interconnect each GSU transformer to its respective bay in the generation switchyard. CTGs will synchronize to the grid across each of their 13.8 kV generator breakers.

2.2.4 Grading and Drainage

The gradient of the Project Site slopes downward from the northeast to southwest at a natural grade of approximately 1 percent. The Project Site has existing swales and channels incised by past surface stormwater runoff that are generally less than 1 foot in depth. The site preparation earthwork includes surface grading to level and maintain the existing natural gradient. Site grading and earthwork activities will be designed to direct stormwater away from equipment and buildings to the stormwater basins (see Figure 2.2-6, Preliminary Grading Plan). Excavated material from the stormwater basins will be utilized onsite as select fill. It is not expected that the import of additional fill material will be necessary to facilitate site grading, however it will be necessary to import limited quantities of specialized granular fill for road base and possible use below foundations.

2.2.5 Buildings and Structures

The Project includes an approximately 5,000-square-foot administration building. The building is divided between the control room and office area and the maintenance and warehouse area. The building construction is Type II-N. The height of the building is approximately 20 feet. The natural gas compressor and air compressor skids are located north of the administration building (see Figure 2.2-7, Plant Elevations – North/South, and Figure 2.2-8 Plant Elevations – East/West). The Project will also include a 1,200 square foot control building in the generation switchyard.

2.2.6 Roads and Fencing

Roadways and parking areas within the Project Site will be paved with asphalt. Unpaved surfaces in and around the main equipment area will be covered with crushed stone or gravel. An 8-foot tall metal fabric security fence with barbed wire or razor wire on top will enclose the entire Project Site, including stormwater basins. Access to the Project Site will be controlled through security gates.

2.2.7 Power Plant Construction

Construction activities are limited to the southwest portion of the Property. Project Site preparation includes removing miscellaneous debris and old steel transmission tower sections, along with surface grading. Construction of the stormwater retention basins requires removal and disposal of approximately 24,000 cubic yards (CY) of material. This material will be used as general fill to provide drainage slope away from for localized equipment, and to construct the aforementioned flood protection berms along the north and east sides. No soil will be exported.

The construction period is expected to last 9 months from September through May to avoid the hottest period of the year. Due to worker health and safety considerations associated with high daytime temperatures, early work hours (prior to daybreak) may be adopted. Additionally, construction activities may need to occur during nighttime hours but would be limited to quiet work and critical work advanced to accelerate the project schedule (accelerated work).

Some activities during construction are continuous in nature (such as concrete pours or performance and emissions testing), and will require extension of work hours based on inherent process requirements or material driven characteristics. These continuous construction and commissioning activities are considered nonrecurring events. All nighttime work activities will be conducted with the proper approvals.

The workforce is expected to average 40 construction workers, peaking at approximately 60 workers. The workforce is expected to commute daily within Imperial County, with an average roundtrip commute distance of 60 miles. Temporary construction activities such as truck traffic or heavy equipment work will be primarily conducted during daylight hours.

Construction traffic will utilize the secondary access to the Project Site. Construction trailers will be located in the temporary construction area west of the Project Site. The construction laydown areas will be located to the north of the power block. Construction parking will be located north of the Project Site.

Construction of the approximately 1,800 feet of natural gas lateral will be handled by SCGC and will involve: (1) tapping the two existing transmission pipelines north of SCGC's Niland natural gas regulator station; (2) installation of a bridle connecting to both transmission lines along with associated valving; (3) trenching for and installation of the lateral, including one underground road crossing north across Beal Road, and (4) installation of the meter station.

Construction of the approximately 700 feet of water lateral will be handled by GSWC and will involve tapping the existing 12-inch main with an 8-inch lateral, installation of an underground isolation valve at the tap location, trenching for the lateral, and installation of a water meter inside the fence in the northwest corner of the Project Site.

2.3 SCHEDULE

The Project is based upon the schedule presented in Table 2.3-1, Anticipated Project Schedule.

TABLE 2.3-1
ANTICIPATED PROJECT SCHEDULE

Action	Date
SPPE application submitted to CEC	March 2006
SPPE permit granted by CEC	September 2006
ICAPCD authority to construct	November 2006
Conditional use permit granted by Imperial County	November 2006
Major equipment procurement	December 2006
Construction start	September 2007
Major equipment deliveries	January 2008
Commercial operation	May 2008

Notes:
CEC = California Energy Commission
ICAPCD = Imperial County Air Pollution Control District

2.4 PROCESS DESCRIPTION

The Project consists of two simple-cycle CTGs fired on natural gas and equipped with mechanical inlet air-cooling to improve capacity and efficiency. The common systems for the CTG pair include the air-cooled chiller package and balance of plant (BOP) electrical distribution module (see Table 2.4-1, Plant Performance). The Project process water needs are limited to demineralized water injection for power augmentation.

Performance

Table 2.4-1, Plant Performance, summarizes plant performance at various operating temperatures (see Figures 2.5-1A through 2.5-1E, Heat and Mass Balance Diagrams, for more detailed information regarding the Project operating temperatures). Each air-cooled generator is rated at 46.5 MW at 72ºF, for a combined Project total of approximately 93 MW.

TABLE 2.4-1
PLANT PERFORMANCE

Temperature	Relative Humidity	Net Capacity	Net Heat Rate (HHV)
39ºF	80%	93,848 kW	9,346 Btu/kWH
72ºF	45%	92,790 kW	9,464 Btu/kWH
100ºF	22%	89,930 kW	9,765 Btu/kWH
110ºF	19%	88,190 kW	9,958 Btu/kWH
115ºF	18%	87,070 kW	10,086 Btu/kWH

Notes:

39ºF is the average monthly minimum temperature.
72ºF is the average annual temperature.
100ºF is the temperature at which 40 percent of the plant operation is assumed to occur.
108ºF is the average monthly maximum temperature.
110ºF is the temperature at which 40 percent of the plant operation is assumed to occur.
115ºF is the temperature at which 20 percent of the plant operation is assumed to occur.
ºF = degrees Fahrenheit
% = percent
Btu/kWH = British thermal unit per kilowatt hour
HHV = higher heating value
kW = kilowatt

2.4.1 Combustion Turbine Generation Equipment

The power island equipment consists of two GE LM6000 PD SPRINT NxGen CTGs including a generator equipment package with weatherproof acoustic sound enclosure, auxiliary equipment control module skid, fuel gas filter separator skid, multi-stage inlet air filter assembly, 13.8-kV switchgear, and associated GSU transformer (see Table 2.4-2, Major Equipment Descriptions).

TABLE 2.4-2
MAJOR EQUIPMENT DESCRIPTIONS

Equipment	Quantity
Combustion Turbine Generators	2
Fuel Gas Compressor	3
Air Cooled Chiller	1 (common with two trains)
SCR with CO Catalyst	2
CEMS	2
Aqueous Ammonia Storage Tank	1
Fire/Raw Water Tank	1
Demin Water Storage Tank	1
Mobile Demin Trailer Facility	1 (capacity for two trailers)
Motor Driven Fire Pump	1
Diesel Driven Fire Pump	1
Air Compressor	2
92-13.8 kV GSU	2
13.8-4.16 kV Medium Voltage Transformers	2
13.8 kV-480 V SAS Transformers	2
Power Distribution & Control Enclosure	1
Black-start Generator	1
92 kV Circuit Breaker	3
Generation Switchyard Control Enclosure	1

Notes:
CEMS = continuous emissions monitoring systems
CO = carbon monoxide
GSU = generator step-up
IID = Imperial Irrigation District
kV = kilovolt
SCR = selective catalytic reduction
V = volt

The CTG inlet air cooling system is equipped with chiller coils associated with the inlet air filters of each unit and a common air-cooled mechanical chiller package, using R134A non-toxic refrigerant. CTGs are equipped with air-cooled lube oil coolers and air-cooled generators. The generator cooling air temperature is reduced below ambient by the chiller package when required for operation during high ambient temperature conditions. The primary use of water at the Project will be to inject demineralized water for power augmentation of the CTGs (Spray Intercooling [SPRINT]). The Project employs the BACT to limit emissions. The exhaust natural gas from CTGs is directed through a SCR module and carbon monoxide (CO) catalyst reactor for exhaust emissions control. Each stack is provided with a Continuous Emissions Monitoring System.

2.4.2 Emission Control Equipment

The LM6000 dry low NO_x emissions reduction technology achieves uncontrolled engine emissions levels of 25 parts per million (ppm) NO_x and 25 ppm CO over the range of 60 to

100 percent load, resulting in a plant operating range of 30 to 100 percent. Each CTG exhaust is equipped with an aqueous ammonia–based, SCR NO_x emission control systems to further reduce NO_x emissions to 2.5 ppm. Each CTG exhaust is also equipped with a CO catalyst to further reduce CO emissions to 6.0 ppm.

2.5 OPERATIONS AND EMISSIONS

2.5.1 Startup and Operating Limits

The proposed startup and operating limits for the Project are outlined as follows:

1. One-time startup and commissioning – 400 hours total
   - 200 hours per turbine of uncontrolled emissions for startup and commissioning of the turbine and SCR
2. Annual operation (two turbines combined) – 6,400 hours total
   - 5,960 hours of fully controlled emissions
   - 40 hours of uncontrolled emissions for annual maintenance and testing
   - 333 hours associated with 500 startups composed of 10 minutes of uncontrolled emissions and 30 minutes of linearly decreasing controlled emissions
   - 67 hours associated with 500 shutdowns composed of 8 minutes of uncontrolled emissions.
3. Emergency equipment testing emissions
   - Diesel-driven fire pump tested weekly for 30 minutes
   - These two units will be tested for 30 minutes per week and 1 hour per month

2.5.2 Project Maximum Daily Emissions

For purposes of air modeling, the following maximum daily emissions for the Project were summarized as follows:

- Eight startups and shutdowns (6.4 hours) coupled with 8 hours of uncontrolled "maintenance" emissions and 33.6 hours of controlled emissions to fill out 48 hours (two CTGs operating 24 hours).

2.5.3 Best Available Control Technology

The expected BACT emission levels for the various pollutants are summarized below:

- NO_x 2.5 ppm dry volume (ppmvd) @ 15% O_2, 3 hour average
- CO 6.0 ppmvd @ 15% O_2, 3 hour average
- VOC 2.0 ppmvd @ 15% O_2, 3 hour average
- PM_{10} Pipeline quality natural gas (as currently proposed by the Applicant)

- SO_x Natural gas shall not contain more than 0.75 grains of total sulfur compounds per 100 SCF
- Ammonia slip 5.0 ppmvd @ 15% O_2, 3 hour average

See Attachment F in Appendix B for a copy of the Letter of Agreement on BACT standards between the ICAPCD and IID.

2.5.4 Emission Reduction Credits

The BACT emission levels have been applied to the startup and operating limits for the Project:

Startup and shutdown emissions are based upon GE standard International Standards Organization (ISO) conditions of 59ºF. Full-load emissions are based upon annual average ambient temperature of 73ºF. GE has stated that although emissions may increase slightly at lower temperatures, the supplied values are applicable for the range of temperatures where the plant is expected to operate.

Given BACT emission levels and annual operating assumptions, ERCs have been provided to offset the Project's annual emissions, as shown in Table 2.5-1, Project Offset Package Accepted by ICAPCD.

TABLE 2.5-1
PROJECT OFFSET PACKAGE ACCEPTED BY ICAPCD

Parameter	NO_x (tons/year)	ROC (tons/year)	PM_{10} (tons/year)
Project Emissions	19.39	4.26	10.13
Required credits based on 1.2:1 ratio	23.27	5.11	12.16
Proposed/required offsets	23.27/23.27	5.11/8.94	12.16/15/05
IID's currently banked credits	23.27	1.28	9.27
Credits required for interpollutant trade	NA	3.83 tons provided in the form of 7.66 tons of NO_x credits based on 2:1 ratio	2.88 tons provided in the form of 5.78 tons of PM_{10} from El Toro based on non-traditional PM_{10} credits for combustion credits at a ratio of 2:1

Notes:
IID = Imperial Irrigation District
NOx = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 micrometers in diameter
ROC = reactive organic compounds

2.6 FUEL SYSTEM

The Project Site offers a superior location from a natural gas transportation perspective. The SCGC System from the Hayfield receiving station to the Niland receiving station can transport 270,000 million British thermal units (MMBtu) per day of natural gas commodity. South of the Niland receiving station, the pipeline is reduced in size and has a transportation capacity of

91,000 MMBtu per day. Therefore, at the Niland receipt point for the Project, nearly 180,000 MMBtu per day is available for the Project. The expected peak day delivery to the Project is approximately 21,000 MMBtu per day. SCGC has provided a will-serve letter to IID confirming their ability to offer firm natural gas transportation capacity to the Project. IID Supply and Trading and SCGC have existing firm and interruptible transportation agreements in place. SCGC has confirmed their willingness to amend the agreements to include the new Niland receipt point on the SCGC system to serve the Project. A copy of this letter is included as Appendix J, Southern California Gas Company Will Serve Letter.

2.6.1 Fuel Gas Requirements

Natural gas pressure has historically been maintained at or above 500 pounds per square inch (psig) at this location in the SCGC transmission system. The LM6000 fuel gas inlet pressure requirement is 695 ± 20 psig. Consequently, the fuel gas supply pressure will be increased for the Project from approximately 500 psig to 725 psig using three motor-driven compressors, each sized to meet the needs of one combustion turbine.

Three common fuel gas compressors are included as part of the Project. Each compressor is sized to meet the needs of a single LM6000. Thus, there are three 50 percent capacity compressors from a plant perspective.

2.6.2 Fuel Supply

The Project natural gas consumption is approximately 880 MMBtu per hour for the pair of CTGs with an ambient temperature of 115ºF. Natural gas supply will be contracted by IID Supply and Trading with third-party marketers to provide a portfolio of supply agreements to manage credit, term and volume risk. Daily nominations on the SCGC pipeline system will be performed by the contracted marketers to match generation schedules. Marketers will deliver natural gas commodity volumes to the “SoCal Border” as the primary delivery point on the SCGC system. Upon delivery to the SCGC system, IID Supply and Trading will nominate deliveries in accordance with existing transportation agreements.

The Project natural gas is transported through the SCGC pipeline running along the east Property boundary (Figure 2.1-2, Project Location Map). The Project natural gas lateral taps into both the SCGC pipelines upstream of the Niland regulating station that reduces the pressure of natural gas flowing farther south. A Project natural gas lateral will run west from the SCGC pressure-regulating station along an existing right-of-way on the south side of Beal Road. The lateral then turns north and is routed along the east side of the Project Site entrance and terminates into the meter station. The SCGC plant meter station will be located on the southeastern edge of the Project Site.

2.7 WATER SUPPLY AND USE

2.7.1 Water Use Requirements

As compared to other power plants with similar configurations, this Project will use a relatively small amount of water through the incorporation of engineered features, including:

- A dry low NO_x combustion system to eliminate water injection.
- An air-cooled chiller to eliminate the need for a cooling tower.
- Chiller coil condensate recovery and reuse.

A small amount of water will be used for the LM6000 SPRINT power augmentation system. The SPRINT system adds approximately 7 MW to the total Project capacity. Assuming no chiller coil condensate recovery, the total demineralized water supply requirement is approximately 35.2 gpm, or approximately 33,800 gallons per day (gpd), based upon 16 hours of operation. In continuous 24-hour operation, approximately 50,700 gallons would be consumed. In order to address the Project water requirements, GSWC has provided a will-serve letter to IID confirming the available water capacity at the Project site, and their willingness and ability to serve the Project. A copy of this letter is included in Appendix L, Water Resources Information.

Subject to atmospheric conditions, condensation from the CTG inlet air-chilling coils can provide a significant onsite water generation stream of approximately 15 gpm, reducing the plant raw water demand. The condensate is captured and sent to the raw-water tank. The balance of the plant's water requirements would be provided by make-up water supplied to the site (see Table 2.7-1, Project Water Requirements).

TABLE 2.7-1
PROJECT WATER REQUIREMENTS

Temperature	Relative Humidity	Coil Condensate Flow	Make-Up Water Flow
100°F	22%	11.3 gpm	23.9 gpm
110°F	19%	17.2 gpm	18.0 gpm
115°F	18%	22.0 gpm	13.2 gpm

Notes:
°F = degrees Fahrenheit
% = percent
gpm = gallons per minute

2.7.2 Water Supply and Treatment Systems

The 12-inch GSWC water supply pipeline that supplies the Town of Niland originates at the GSWC storage tanks located across Cuff Road northeast of the Property. These tanks have a combined capacity of approximately 2 million gallons. The GSWC water supply is sourced through a pipeline that originates at the Calipatria water treatment plant located approximately 10 miles to the south. The Project has obtained from GSWC a will-serve letter that states that their existing 12-inch pipeline supplying the Town of Niland has sufficient capacity to also supply the Project (see Appendix L). Water would be delivered to the Project Site at a peak flow of 500 gpm (500 gpm fire water replenishment in an emergency or 40 gpm operational usage) through a buried 8-inch pipeline lateral that connects to the 12-inch pipeline. This water supply would support the minimal onsite potable water requirements, and would fill the 400,000-gallon fire/service water storage tank (service water would be demineralized in water-treatment trailers), which would feed the 150,000 gallon demineralized water storage tank. The portable water-treatment trailers would be regenerated offsite at the water treatment vendors permitted facility. See Section 6.13, Water Resources, and Appendix L, Water Resources Information, for a summary of the potable water quality data available to the Project.

2.7.3 Water Supply Options

IID has taken significant steps to minimize the use of water by (1) using combustion turbines with dry low NO_x burners, (2) incorporating an air-cooled chiller in lieu of a wet cooling tower, and (3) recovering condensate from the chiller coils. A relatively small amount of water is used for the SPRINT power augmentation system on each combustion turbine (see Figure 2.7-1, Water Balance Diagram).

The maximum demineralized water consumption is estimated at approximately 21 acre-feet per year (afy) based upon the permitted operating hours. This assumes no condensate recovery from the chiller coils. With condensate recovery included, the 35 gpm could be reduced to 13 gpm. To provide some context for this number, if LM6000 PC SPRINT combustion turbines were used with a chiller utilizing a cooling tower, the water requirements would be closer to 250 gpm at 115ºF (or approximately 100 afy) versus 35 gpm for the Project.

A significant portion of the water necessary for SPRINT augmentation would come from the recovery and demineralization of the chiller condensate. Depending on temperature and humidity, that portion of chiller condensate available would range from 30 to 60 percent of the total needs, and is expected to average about 45 percent on an annual basis. See Table 2.7-2, Water Consumption, for an estimate of the Project's water consumption expressed in afy.

TABLE 2.7-2
WATER CONSUMPTION

Operating Hours	Annual Consumption[1]	Raw Water Consumption	Coil Condensate Recovery
6,400	20.75 acre-feet	11.45 acre-feet	9.30 acre-feet

[1]In calculating annual water usage, 20 percent of the time was assumed to be at 115°F, 40 percent of the time was assumed to be at 110°F, and 40 percent of the time was assumed to be at 100°F.

The following inland water supplies sources were considered for the Project:

- The East Highline Canal, an imported water distribution canal operated by the Imperial Irrigation District and located adjacent to the site (Colorado River Water).
- Groundwater at or near the site.
- Demineralized water from the El Centro Generating Station transported to the Project by truck (Colorado River Water).
- Water from the GSWC pipeline that crosses the site and supplies the Town of Niland with potable water.

The first two options were considered and are not being pursued for the following reasons:

- Water from the East Highline Canal. This option was considered environmentally and uneconomically sound. Although this is the same source of water as used by the GSWC, additional on-site treatment for removal of suspended solids and off-site lateral impacts would be required for implementation.

- Based on discussions with the Regional Water Quality Control Board, the presence of groundwater of sufficient quality or quantity at or nearby the site is considered to be unlikely.

Based on the foregoing considerations, two options remain:

- Using demineralized water transported by truck from IID's El Centro Generating Station (ECGS) located approximately 37 miles to the south.

  The ECGS, owned and operated by the IID, is located approximately 37 miles from the Project Site. Demineralized water is available at the ECGS and could be transported by tanker truck to the Project Site. Assuming a maximum demineralized water supply requirement of up to 50,700 gallons per day (based on 24 hours of operation), and a truck approximately 8,000 gallons in size, this alternative would require six to seven round trips per day. It has been determined that this alternative will be used only as a backup demineralized supply due to the reduced reliability, cost, air quality and potential traffic impacts associated with this alternative. In addition, as the ECGS also relies on water imported from the Colorado River for supply, this alternative would provide no net reduction in imported use relative to use of the potable supply from the GSWC.

- Using water from the GSWC's water pipeline that crosses the site (Proposed Alternative).

  Based on the minor annual water requirements of no more than 21 acre-ft per year, the use of potable water from GSWC is preferred as the primary water supply option for the Project.

  However, under any emergency conditions caused by outages on the GSWC system, alternate demineralized supplies could be transported from the El Centro Generating Station.

This Proposed Alternative is based on the following:

- The pipeline is located on the site property therefore no off site linears are required and interconnection costs are manageable.
- The minor water supply requirements for the Project.
- The more than adequate water supply from GSWC, and the robust storage capacity available near the Project Site.
- The desire to avoid creating additional impacts to the environment via the exhaust emissions associated with continuous operation of diesel trucks during the summer months between the El Centro and Niland power plants.

2.8 WASTEWATER

2.8.1 Process Wastewater

There is no continuous process wastewater stream that results from plant operations. The Project will generate a negligible waste stream, consisting of the minor condensation streams from the compressed air and continuous emissions monitoring systems (CEMS). Potentially contaminated drains will be directed to the oil/water separator, and then discharged to a wastewater sump for visual inspection and evaporation of normal minor flows. Wastewater generated as a result of equipment washdown activities will first go through the oil/water separator. Potentially contaminated water will be trucked off-site for disposal at a licensed hazardous waste storage and treatment facility. Abnormal flows, such as those that might occur from water storage tank overflow, will be allowed to overflow from the wastewater sump into the stormwater retention basins, which is discussed in Section 2.8.3, Stormwater Management. Stormwater trapped in outdoor containment areas will evaporate due to the hot and dry ambient conditions.

2.8.2 Sanitary Waste

Sanitary sewage at the Project Site will be managed based on the estimated two facility employees. Generated waste will be collected and held onsite in a 1,500 gallon septic holding tank, and will be pumped to tanker truck and shipped to a sanitary water treatment plant on a monthly basis. During any temporary major maintenance event, portable facilities will be provided to accommodate additional work.

2.8.3 Stormwater Management

During the rare storm event that occurs in the vicinity if the Project, stormwater typically flows across the Property in a southwesterly direction, from the northeast corner of the Property toward the Project Site. Project Site grading and earthwork activities will be designed to direct stormwater generated on the Project Site away from equipment and buildings (see Figure 2.2-6, Preliminary Grading Plan), and to direct stormwater generated on the Property away from the Project Site (offsite flows). A total of three stormwater basins will be associated with the Project, and they are described below. These basins will be sized in accordance with the ”Engineering Guidelines Manual for the Preparation and Checking of Street Improvement, Drainage and Grading Plans Within Imperial County.”

Onsite Flows

An unlined stormwater retention basin will be located at the south central portion of the Project Site. The basin will be sized to retain the equivalent volume of 5 inches of stormwater spread across the Project Site, which exceeds the 3.58 inches of rain that would be generated by a 100-year, 24-hour storm event. The basin will retain all stormwater generated onsite and will not discharge stormwater offsite. Collected stormwater will pass through an oil-water separator, will then be collected in the basin, which will empty by evaporation and/or percolation. Appropriate provisions will be taken to address mosquito abatement where necessary. The volume of the retention basin for managing runoff from the Project Site will be approximately 290,000 cubic feet, based on its approximate area of 1.5 acres (65,340 SF) by its approximate 4.5 foot depth.

Offsite Flows

Stormwater flowing southwesterly across the Property toward the Project Site will be intercepted by trenches located along the east and north fence lines, and directed to two separate “offsite” stormwater detention basins. The two detention basins will be located at the northwest and southeast corners of the Project Site inside the fence. They will not be designed to contain a particular storm event, but rather, will have the effect of reducing the velocity of the surface flow and settling out silt. Once in the basins, collected stormwater will typically evaporate and/or percolate into the ground. On those rare occasions when stormwater may overflow the basins, it will be directed via lined channels to existing natural channels downstream of the Project Site. The combined volume of the detention basins for managing offsite stormwater is approximately 105,000 cubic feet, based on an approximate area of 0.8 acres (0.4 acres each or 34,848 SF) by their approximate 3.0 foot depth. The material excavated for the interceptor trenches (approximately 82,000 CF) will be used to construct berms adjacent to the north and east fence lines of the Project, which will assist in the directing of offsite stormwater.

2.9 HAZARDOUS MATERIAL MANAGEMENT

The Project will require the use of hazardous materials for operation, including aqueous ammonia, lubricating oil, SF_6 gas, and transformer insulating oil.

Bulk materials will be in tanks and containers. Quantities less than 55 gallons will only be stored in the delivery containers themselves, and will not be kept elsewhere in smaller containers.

Aqueous Ammonia Storage

The Project includes a 12,000-gallon aqueous ammonia (19 percent solution) storage tank and delivery system to support the emissions control systems. The capacity of the aqueous ammonia storage tank is based upon the Project operating profile, and the anticipated monthly aqueous ammonia deliveries from an 8,000-gallon capacity tanker truck. The common storage tank and unloading ramp containment capacity is designed to accommodate 110 percent of the total storage tank capacity. The aqueous ammonia is delivered to the SCR ammonia vaporizing skids through an underground double-walled piping distribution system. Mitigations associated with a potential exposure to the atmosphere in the event of an aqueous ammonia spill are discussed in detail in Section 6.8, Public Health and Safety (either an underground containment vault or plastic balls floating on top of the aqueous ammonia in an above ground containment area).

Other hazardous materials that will be used and stored during operation of the plant are listed in Table 2.9-1, Hazardous Materials Use and Storage.

Table 2.9-1
HAZARDOUS MATERIALS USE AND STORAGE

Chemical	Use	Storage	Location	Delivery	Notes
Aqueous ammonia (19% solution)	~600 gallons/ 24- hour operating day (400/16-hour day)	12,000 gallons	Outdoor tank	Biweekly	8,000 gallons delivery quantity
Transformer mineral insulating oil	NA	~12,100 gallons	Equipment skid Generation Switchyard	NA	<5,000 gallons per GSU transformer (2 total) <500 gallons per auxiliary transformer (4 total) <25 gallons per voltage transformer (2 total) <50 gallons per metering unit (1 total)

Table 2.9-1
HAZARDOUS MATERIALS USE AND STORAGE

Chemical	Use	Storage	Location	Delivery	Notes
SF_6 Gas	N/A	N/A	Generation Switchyard Niland Substation	N/A	<60 lbs per circuit breaker (4-total)
CTG synthetic lubricating oil	NA	~300 gallons	Equipment skid	NA	<150 per CTG turbine lube oil tank
CTG mineral lubricating oil	NA	~1,000 gallons	Equipment skid	NA	<500 per CTG generator lube oil tank
BOP equipment lubricating oil	NA	<100 gallons	Equipment skid	NA	3 natural gas compressors 2 air compressors
Diesel fuel oil #2	NA	<250 gallons	Indoor tank	NA	Diesel fire pump fuel

Notes:
% = percent
~ = approximately
< = less than
BOP = balance of plant
CTG = combustion turbine generator
GSU = generator step-up
NA = not applicable
NO_x = nitrogen oxide(s)
SCR = selective catalytic reduction
SF_6 = Sulphur Hexaflouride

All hazardous materials will be stored in appropriate tanks with the required separation and secondary containment, which will include allowances for fire suppression and stormwater where appropriate.

Emergency shower and eyewash stations will be located near the aqueous ammonia storage and use areas.

2.10 PLANT AUXILIARIES

The Project auxiliary systems include: water from the GSWC lateral (potable water, raw water, fire water, demineralized water); aqueous ammonia; fuel gas; compressed air; equipment drains; and sanitary sewer.

- Potable water – This system supplies potable water for human use and emergency shower and eyewash stations.
- Raw water – This system receives make-up water to the site and stores a minimum required volume for use as a source of fire water along with some additional water to be subsequently processed into demineralized water.
- Fire water – This system is composed of motor-driven and engine-driven fire pumps that draw water from the raw water system for delivery through the fire system as needed to suppress fires.

- Demineralized water – This system receives raw water and collected condensate from the combustion turbine inlet air chiller coils, passes it through portable trailer-mounted demineralizer systems, and delivers it for storage in the demineralized water tank. Water from that tank is then withdrawn for injection into the LM6000s for power augmentation as part of the SPRINT system.
- Aqueous ammonia – This system provides for the receipt, storage, and delivery of 19 percent aqueous ammonia to the two SCRs to reduce NO_x emissions. Aqueous ammonia is delivered to the site via tanker trucks and deposited in a storage tank. Aqueous ammonia is then pumped to each SCR where it is sprayed into the CTG exhaust flow to reduce plant emissions.
- Fuel gas – This system receives natural gas from SCGC and then meters, compresses, and conditions it for injection as fuel for the LM6000s.
- Compressed air – This system provides both service air and instrument air throughout the plant. Service air is used primarily for maintenance activities within the plant. The instrument air system is used for the operation of control systems, primarily pneumatic valves.
- Equipment drains – This system is used to collect any water discharged from plant equipment, or that comes in contact with plant equipment. This water passes through an oil-water separator and the resulting clean water is sent to the wastewater sump for inspection and normal evaporation. Sump overflow is sent to the storm water retention basins.
- Sanitary sewer – This system is used to collect and dispose of wastewater resulting from human use, which will be collected and held onsite for removal on a monthly basis.

2.10.1 Project Lighting Systems

There are three basic outdoor lighting systems for the Project. Project lighting systems will meet all applicable IES standards, and are described as follows:

- System No. 1 – Roadway and parking area lighting with a minimum illumination level of 1 foot-candle.
- System No. 2 – Power block platform, operation, and maintenance lighting with a minimum illumination level of 10 foot-candle.
- System No. 3 – Fence security lighting with a minimum illumination of 2 foot-candle.

Each outdoor lighting system will be rated at 277V and use high-pressure sodium (HPS) type fixtures ranging from 70 to 400 watts. The quantity, location, and wattage will be determined by the final lighting design. Each outdoor lighting system will be provided with its own manual and automatic control system. A hand-off-auto selector switch with contactor and photoelectric (PE) cell will be used. In the “hand” position, the outdoor system lights will be on continuously. In the “off” position, the lights will be off. In the “auto” position, the photoelectric light sensor will turn the lights on at dusk and off at dawn.

Light fixtures will be shielded and/or pointed inward to eliminate potential impacts to local residents. Typically, ground level area lighting, which is controlled by photocells, will always remain on at night for safety and security purposes, and will have “dark sky” compliant shielding. Elevated equipment lighting on structures is generally controlled by switches, and will only be on when needed for operations. These lights are typically directed away from the fence line and shielded to minimize off-site impact.

- The interior lighting system will incorporate “normal” and “emergency” lighting systems. The normal lighting system operates at 277V. HPS type fixtures will be used throughout the plant, except in the control room/administration enclosure/power distribution control enclosure, where fluorescent type and/or incandescent type fixtures will be used. The lighting system in the control room will be provided with a dimmer system.
- The emergency lighting system (egress lighting, “exit” signs, etc.) will use 90-minute battery packs as required in the manned area, including the control room/administration enclosure/ power distribution control enclosure.
- The GE CTG standard package includes an alternating current (AC) (normal) and direct current (DC) (emergency) lighting for the natural gas turbine unit interior lighting provided as an integral part of packaged combustion turbines.

2.10.2 Fire System

The fire protection system is designed per California Fire Code (CFC) requirements and National Fire Protection Association (NFPA) standards utilizing equipment approved by Underwriter’s Laboratories/Factory Mutual Research Corp (UL/FM) and the California State Fire Marshal (CSFM). The Niland Fire District Fire Chief has also reviewed the plant fire protection philosophy, will approve the final design, and perform site inspections. Construction materials are non-combustible.

The Project includes an underground fire water loop and onsite fire water storage by maintaining a minimum 216,000-gallon fire water reserve within the service/fire water tank. The water tank is filled from the new 8-inch pipeline lateral. The fire pump and storage capacity is based upon 1,500-gpm outside fire flow plus 300-gpm automatic suppression flow for 2 hours. The required fire water flow is supplied by an electric and (backup) diesel fire pump located within a fire pumphouse. A small electric jockey pump maintains system pressure under no-load conditions. The CTG enclosures are protected by a carbon dioxide (CO_2)-based fire suppression system as supplied by the manufacturer, which includes heat and natural gas detection devices.

The oil-filled transformers are isolated from adjacent equipment and structures using physical separation and/or fire walls. The auxiliary transformers are supplied with approved less-hazardous dielectric fluids. Additionally, each transformer also resides within a concrete containment area that serves to:

- Contain oil spills.
- Retain direct contact stormwater that may potentially come in contact with transformer oil.
- Retain fire water that would have come into contact with transformer oil.

The fuel gas compressor enclosure is monitored by heat and natural gas detection devices and protected by a deluge suppression system.

The administrative building is provided with separations per occupancy requirements and monitored by fire detection devices. The Type F occupancy (“factory and industrial”) is protected by a pre-action dry-pipe sprinkler system, and is a common occupancy for power plant control rooms. The Type S occupancy ("storage") is protected by a wet-pipe sprinkler system, and is typical of warehouse space used to store non-hazardous (or exempt quantities of hazardous) materials.

The Project includes fire detection and alarm systems with remote notification to both the Niland Fire District and IID Systems Operations Center (SOC).

2.10.3 Fire Service Water Storage

The Project water storage includes both fire/service water and demineralized water storage tanks. The 400,000-gallon fire/service water storage capacity is based upon a 4-day water supply outage (based on 16 hour operation), plus the required fire water flow for the plant. The height of the water storage tank is approximately 32 feet.

2.11 ELECTRICAL SYSTEM

Each CTG has an associated generator switchgear module, generator step-up transformer, and a control module with motor controls. A common power distribution and control module (PDCM) houses electrical switchgear and motor controls for auxiliary systems powered from the 4160V and 480V systems along with 125VDC and 120VAC critical power systems. PDCM includes double-ended switchgear with associated auxiliary power transformers supplied from each CTG generator switchgear module.

The Project is equipped with a "black-start" natural gas-fired packaged engine generator set. The engine generator is sized for starting one CTG without mechanical chiller or fuel gas compression loads. Once the first CTG is started, it can then be used to start the other plant loads needed for full power operation in addition to the second unit.

2.11.1 Reliability and Safety Systems

The Project is designed with redundancy. With few exceptions (failure of the natural gas lateral or meter station, failure of the overhead 92-kV interconnect), there is no single point of failure that could disable both CTGs.

Additionally, the Project utilizes the LM6000 NxGen package. This package incorporates significant advances that have been implemented to improve the reliability of the LM6000 and reduce spurious trips.

The major equipment has associated hard-wired interlock circuits and manual E-STOP pushbuttons for equipment protection and personnel safety. The control systems include redundant processing where applicable to improve reliability.

IID will provide a dedicated T1 line for Project surveillance, telephone and Internet service. These systems will be supplied using IID's existing bandwidth and PBX infrastructure. PELCO security cameras in conjunction with a "Microwave Intrusion System" will be used to as a means to secure the perimeter of the plant. On-site personnel shall provide additional Project Site surveillance and security where necessary. Nighttime lighting of the construction Site will be required.

2.11.2 Power Plant Grounding Systems

A grounding system will be provided to insure the safety of personnel and equipment in case of electrical equipment failures and to prevent fires and damage from lightning and/or static electricity. The installation will be in accordance with IEEE Standard Publications Nos. 80 and 142. Maximum resistance to ground will be established in accordance with the referenced IEEE standards and determined in detailed engineering after electrical fault levels, soil resistivity, etc., have been determined. The new grounding system will have a minimum of two connections to the existing Niland Substation grounding system.

All structural steel, equipment enclosures, fencing and/or electrical equipment ground buses will be grounded to the grounding system. The grounding system will consist of buried bare copper cables with driven ground rods located strategically throughout the Plant. The minimum conductor size for the ground grid, major the equipment grounding and structure grounding will be copper 4/0 AWG.

2.12 TRANSMISSION SYSTEM

The Project interconnects at the 92 kV level with the existing Niland Substation located in the southwest corner of the Property. The Project includes a generation switchyard having a single-breaker, single-bus configuration. An overhead cable connects the high-voltage side of the GSU transformers to the generation switchyard. An overhead radial transmission line connects the generation switchyard to the Niland Substation.

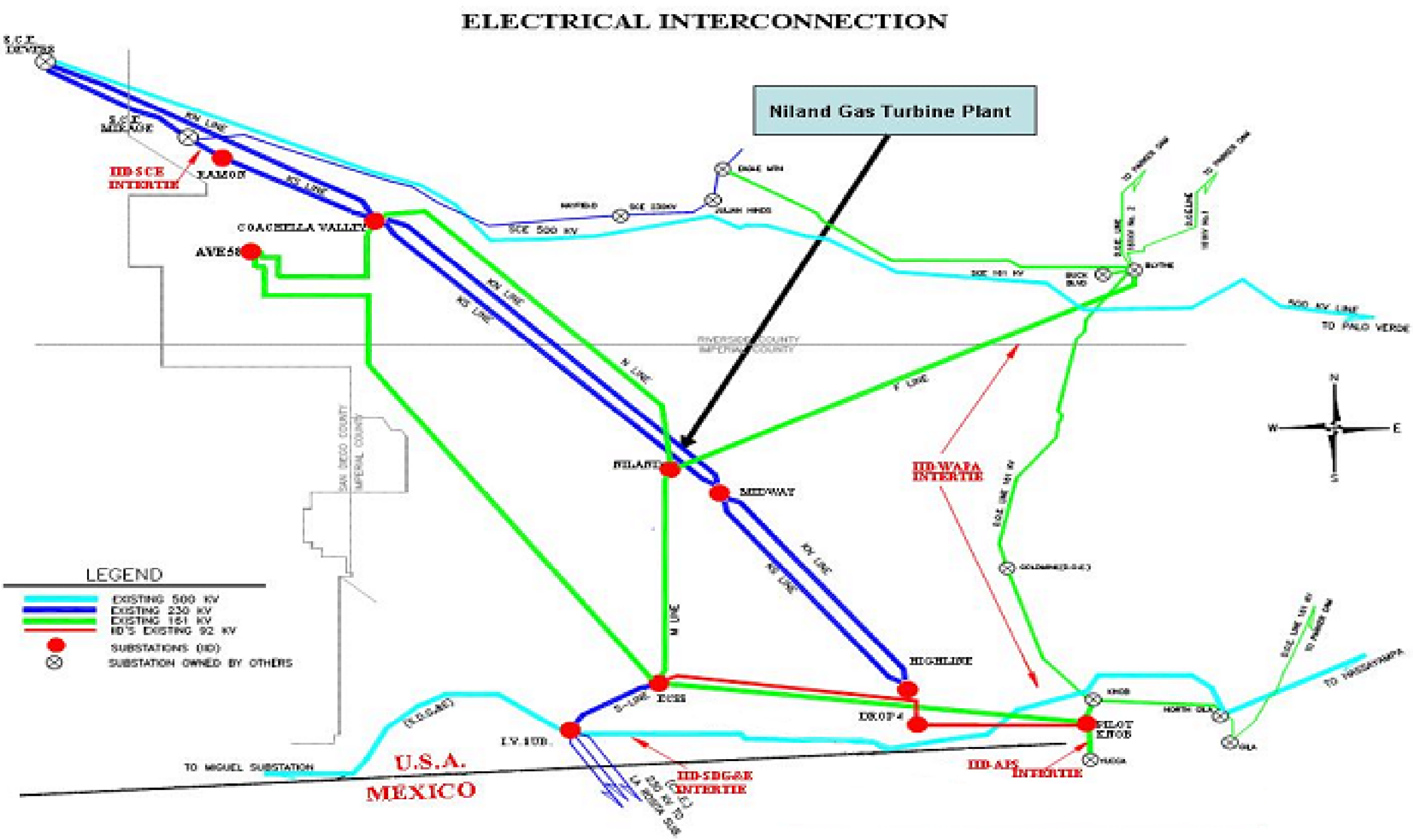
An existing 13 kV overhead distribution line running along the north side of Niland Substation will be partially placed underground to allow interconnection line overhead access into Niland Substation.

A System Impact Study (SIS) was conducted by IID Transmission Planning Group to evaluate load flow, stability, and short-circuit effects of the Project. SIS reported that no impacts were evident and therefore no transmission system upgrades are required to interconnect the Project with the IID transmission system. A copy of this report is included as Appendix A, SIS.

2.13 PLANT CONTROLS

The power train equipment is controlled from the CTG control system. The auxiliary systems are controlled from the BOP control system. The packaged mechanical equipment, such as the chiller, natural gas compressor, air compressor, and water treatment skids also have manufacturer-supplied control systems.

The Project is designed for unmanned operation. The Project controls are linked to the 24-hour-manned SOC. The CTGs may be started or shutdown from the SOC as well as locally from the Project control room at the plant. The control system is equipped with automatic generation control (AGC) functionality to allow each CTG output to be efficiently adjusted to match power system demand.



Not to Scale

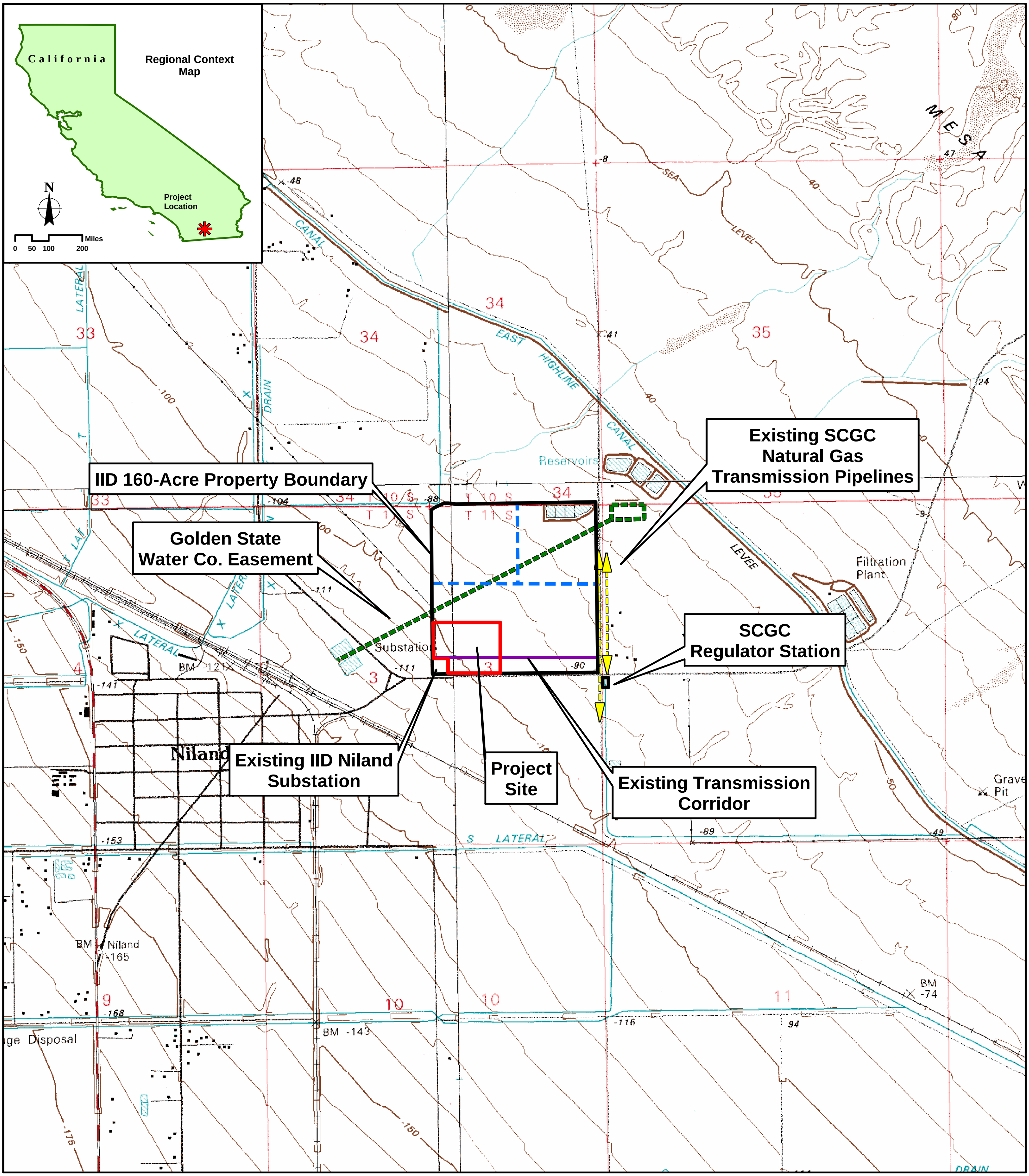
N

SOURCES:
USGS 1:24,000 Scale Quads, various dates

IID Service Territory

Niland Gas Turbine Plant
Imperial Irrigation District

FIGURE 2.1-1



Project Location Map

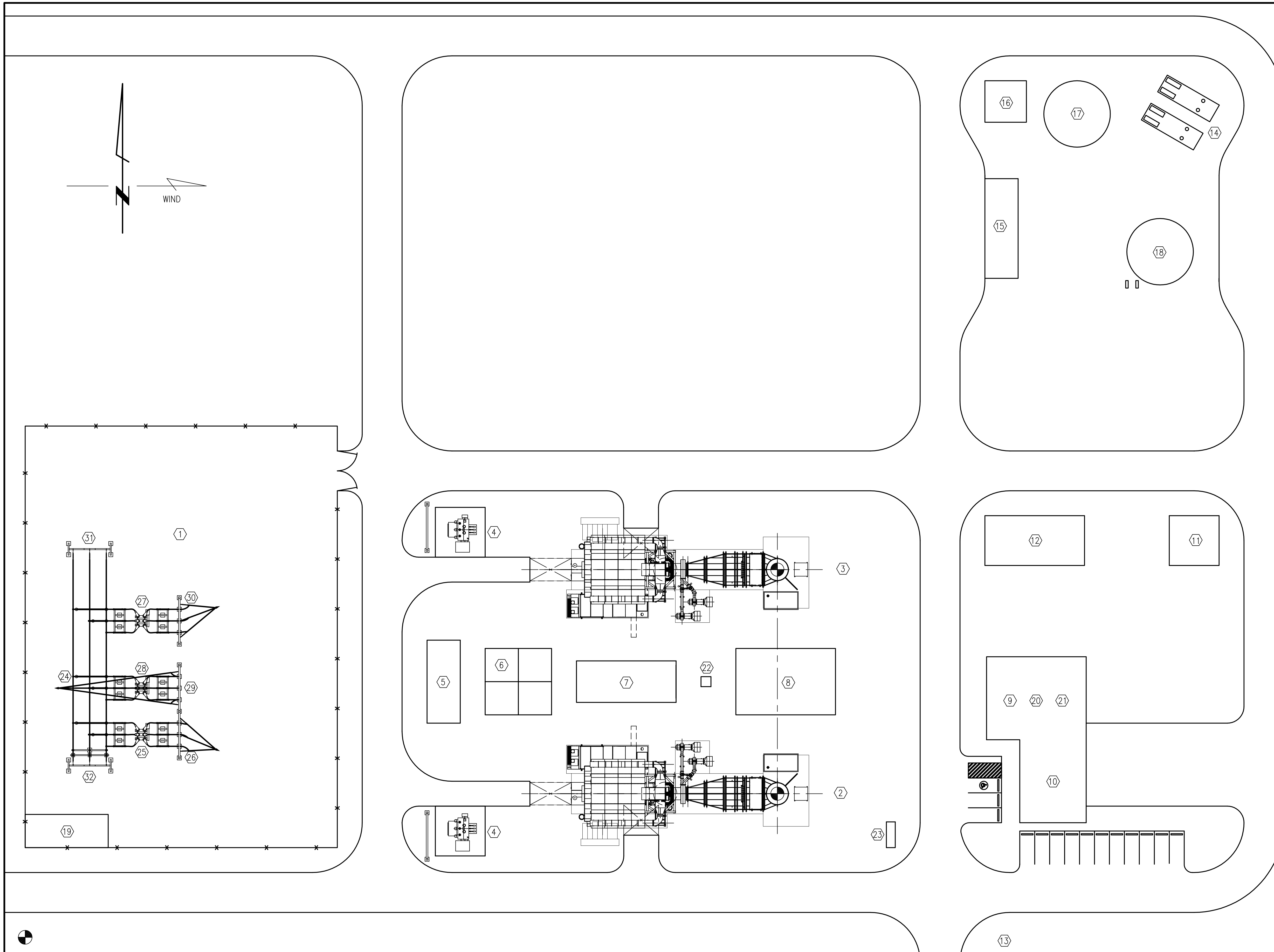
Niland Gas Turbine Plant
Imperial Irrigation District

FIGURE 2.1-2

0 1000 2000 Feet

N

SOURCES:
USGS 1:24,000 Scale Quads, various dates



ITEM	DESCRIPTION	NOTES
1	GENERATION SWITCHYARD	
2	CTG/SCR (LH)	
3	CTG/SCR (RH)	
4	GSU TRANSFORMER	
5	BLACK START ENGINE	
6	AUXILIARY TRANSFORMERS	
7	COMMON POWER MODULE	
8	COMMON AIR COOL CHILLER	
9	CONTROL ROOM	
10	WAREHOUSE	
11	AIR COMPRESSOR SKID	
12	GAS COMPRESSOR SKID	
13	GAS METERING	
14	WATER TREATMENT	
15	AMMONIA STORAGE/UNLOAD	
16	FIRE PUMPHOUSE	
17	RAW WATER TANK	
18	DEMINERALIZED WATER TANK	
19	SWITCHYARD CONTROL BUILDING	
20	OFFICES	
21	BOP ELECTRICAL ROOM	
22	COOLING COIL CONDENSATE SUMP	
23	OIL/WATER SEPARATOR	
24	92KV WEST BUS	
25	CTG1 HIGH VOLTAGE CIRCUIT BREAKER	
26	CTG1 RISER STRUCTURE	
27	CTG2 HIGH VOLTAGE CIRCUIT BREAKER	
28	NILAND HIGH VOLTAGE CIRCUIT BREAKER	
29	NILAND H-FRAME	
30	CTG2 RISER STRUCTURE	
31	NORTHERN 92KV BUS A-FRAME	
32	SOUTHERN 92KV BUS A-FRAME	

LEGEND

NE CORNER OF (EXISTING) NILAND SUBSTATION FENCE

NOTES

1. *

Figure 2.2-1

0 15 30 60 90 FEET

1"= 30'

55nm1_1.dwg

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REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/24/06	WMT	KPR	DEJ	DET
B	ISSUED FOR REVIEW	12/07/05	SML	KPR	DEJ	DCT
A	ISSUED FOR REVIEW	11/21/05	SML	KPR	DEJ	DCT

REFERENCE DRAWINGS

DSGN	KRP	11/09/05
DRN	SML	11/09/05
CKD	DEJ	02/24/06

SCALE: 1"= 30'

FOR 22x34 DWG ONLY

IMPERIAL IRRIGATION DISTRICT

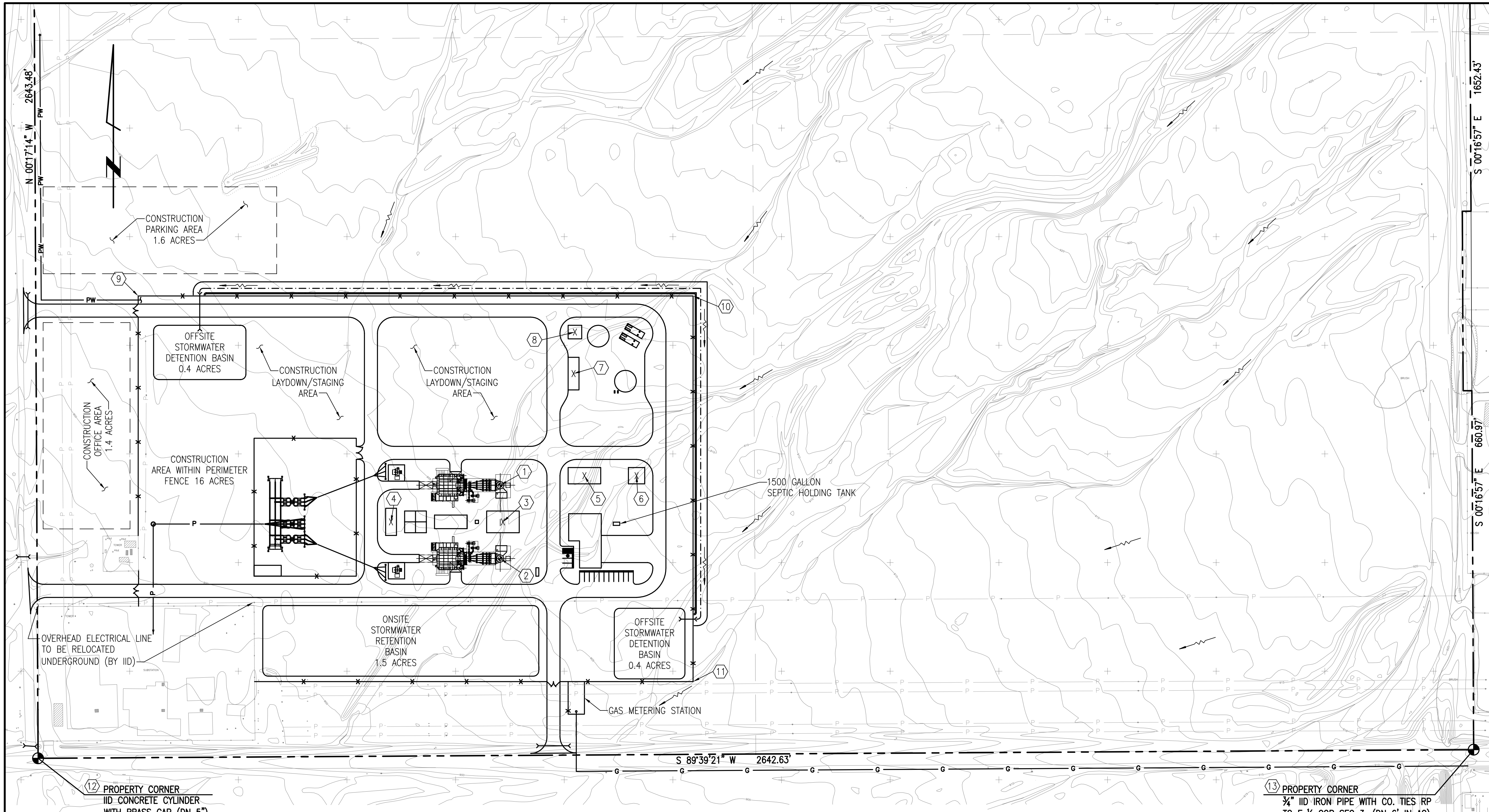
NILAND GAS TURBINE PLANT

GENERAL ARRANGEMENT

JOB NUMBER 108746

REV C

DRAWING NUMBER M1-1



LEGEND

- PROPERTY LINE
- EXISTING OVERHEAD ELECTRICAL LINE
- DRAINAGE SWALE
- CULVERT
- FLOW DIRECTION
- PW — POTABLE WATER LINE
- G — GAS LINE
- X — FENCE
- P — OVERHEAD ELECTRICAL LINE

NOTES

1. TOPOGRAPHIC INFORMATION PROVIDED BY TRI STATE SURVEYING, LTD. (775) 358-9491. PROJECT NO. 05384.01, 8-25-05.
2. PROPERTY CORNER AND BOUNDARY INFORMATION OBTAINED FROM 10/12/05 A.L.T.A. SURVEY BY TESCO TECHNICAL ENGINEERING AND SURVEYING COMPANY. (760) 352-2716. PROJECT NO. 05-8-138.
3. EXISTING FEATURES ARE DEPICTED BY LIGHTER WEIGHT (SCREENED) LINES. NEW STRUCTURES AND FACILITIES ARE SHOWN IN HEAVIER LINES.
4. ELEVATIONS ARE BASED UPON NAVD 1988 PLUS 1000' TO AVOID NEGATIVE VALUES.

LOCATION	DESCRIPTION	STATE PLANE COORDINATE (FEET, NAD 83)		UTM COORDINATE (METERS, NAD 83)	
		NORTHING	EASTING	NORTHING	EASTING
1	CTG #1 EXHAUST STACK	2032942.36	6791282.12	3679252.806	639838.124
2	CTG #2 EXHAUST STACK	2032807.36	6791282.12	3679211.664	639838.418
3	AIR COOLED CHILLER	2032874.86	6791287.12	3679232.562	639840.079
4	BLACK START ENGINE GENERATOR	2032874.86	6791081.12	3679232.461	639776.872
5	GAS COMPRESSOR SKID	2032959.86	6791437.12	3679258.637	639884.985
6	AIR COMPRESSOR SKID	2032959.86	6791533.12	3679258.814	639914.530
7	AMMONIA STORAGE TANK	2033147.84	6791417.12	3679316.078	639878.861
8	DIESEL FIRE PUMPHOUSE	2033224.36	6791419.62	3679339.156	639879.336
9	FENCE CORNER	2033290.86	6790615.75	3679357.560	639634.281
10	FENCE CORNER	2033290.86	6791637.12	3679359.789	639945.552
11	FENCE CORNER	2032580.86	6791637.12	3679143.411	639947.102
12	PROPERTY CORNER	2032439.59	6790431.39	3679097.727	639579.953
13	PROPERTY CORNER	2032455.47	6793073.98	3679108.332	640385.265

Figure 2.2-2

0 50 100 200 300 FEET

1"= 100'

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53nc1_1.dwg

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/24/06	WMT	WKW	WKW	DEJ
B	ISSUED FOR REVIEW	01/17/06	WMT	WKW	WKW	DEJ
A	ISSUED FOR REVIEW	12/19/05	WMT	WKW	WKW	DEJ

REFERENCE DRAWINGS	
M1-1	GENERAL ARRANGEMENT

DSGN	WKW	10/21/05
DRN	WMT	10/21/05
CKD	WKW	10/21/05
SCALE:	1"= 100'	

FOR 22x34 DWG ONLY

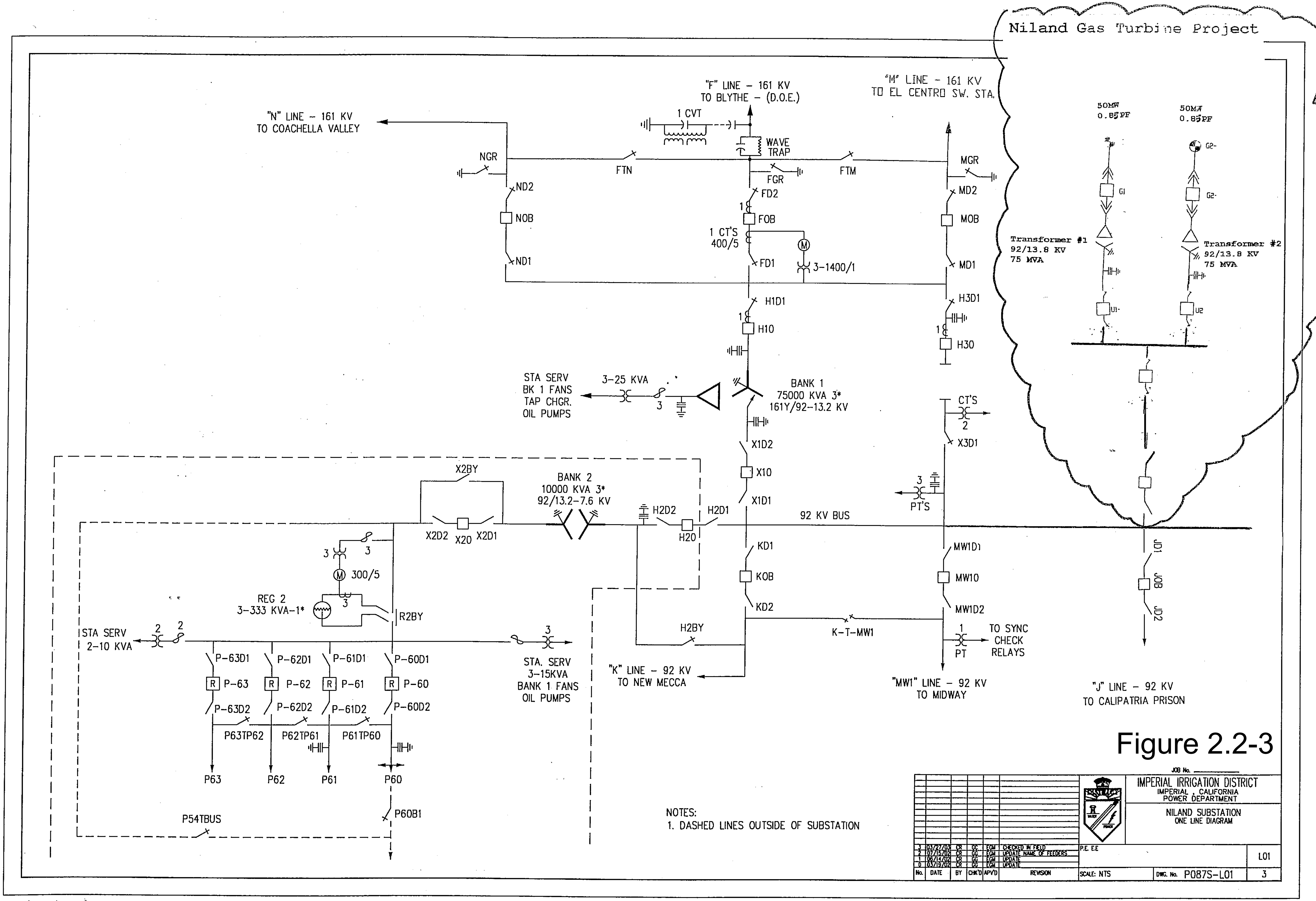
IMPERIAL IRRIGATION DISTRICT

NILAND GAS TURBINE PLANT

SITE PLAN AND UTILITY INTERFACE

JOB NUMBER 108746 — REV C

DRAWING NUMBER C1-1


Niland Gas Turbine Project
"N" LINE – 161 KV
TO COACHELLA VALLEY
"F" LINE – 161 KV
TO BLYTHE – (D.O.E.)
"M" LINE – 161 KV
TO EL CENTRO SW. STA.
1 CVT
WAVE TRAP
NGR
FTN
FGR
FTM
MGR
ND2
NOB
ND1
FD2
FOB
1 CT'S
400/5
FD1
3-1400/1
MD2
MOB
MD1
H1D1
H10
H3D1
H30
STA SERV
BK 1 FANS
TAP CHGR.
OIL PUMPS
3-25 KVA
BANK 1
75000 KVA 3*
161Y/92-13.2 KV
CT'S
X3D1
X1D2
X10
X1D1
PT'S
X2BY
BANK 2
10000 KVA 3*
92/13.2-7.6 KV
H2D2
H2D1
H20
X2D2
X20
X2D1
92 KV BUS
300/5
REG 2
3-333 KVA-1*
R2BY
KD1
KOB
KD2
MW1D1
MW10
MW1D2
JD1
JOB
JD2
STA SERV
2-10 KVA
P-63D1
P-62D1
P-61D1
P-60D1
P-63
P-62
P-61
P-60
P-63D2
P-62D2
P-61D2
P-60D2
P63TP62
P62TP61
P61TP60
P63
P62
P61
P60
P60B1
P54TBUS
STA. SERV
3-15KVA
BANK 1 FANS
OIL PUMPS
H2BY
K-T-MW1
"K" LINE – 92 KV
TO NEW MECCA
"MW1" LINE – 92 KV
TO MIDWAY
TO SYNC
CHECK
RELAYS
PT
"J" LINE – 92 KV
TO CALIPATRIA PRISON
50MW
0.85PF
G1
G2
Transformer #1
92/13.8 KV
75 MVA
Transformer #2
92/13.8 KV
75 MVA
U1
U2
NOTES:
1. DASHED LINES OUTSIDE OF SUBSTATION
IMPERIAL IRRIGATION DISTRICT
IMPERIAL, CALIFORNIA
POWER DEPARTMENT
NILAND SUBSTATION
ONE LINE DIAGRAM
CHECKED IN FIELD
UPDATE NAME OF FEEDERS
UPDATE
UPDATE
REVISION
SCALE: NTS
DWG. No. P087S-L01
L01
3
Figure 2.2-3

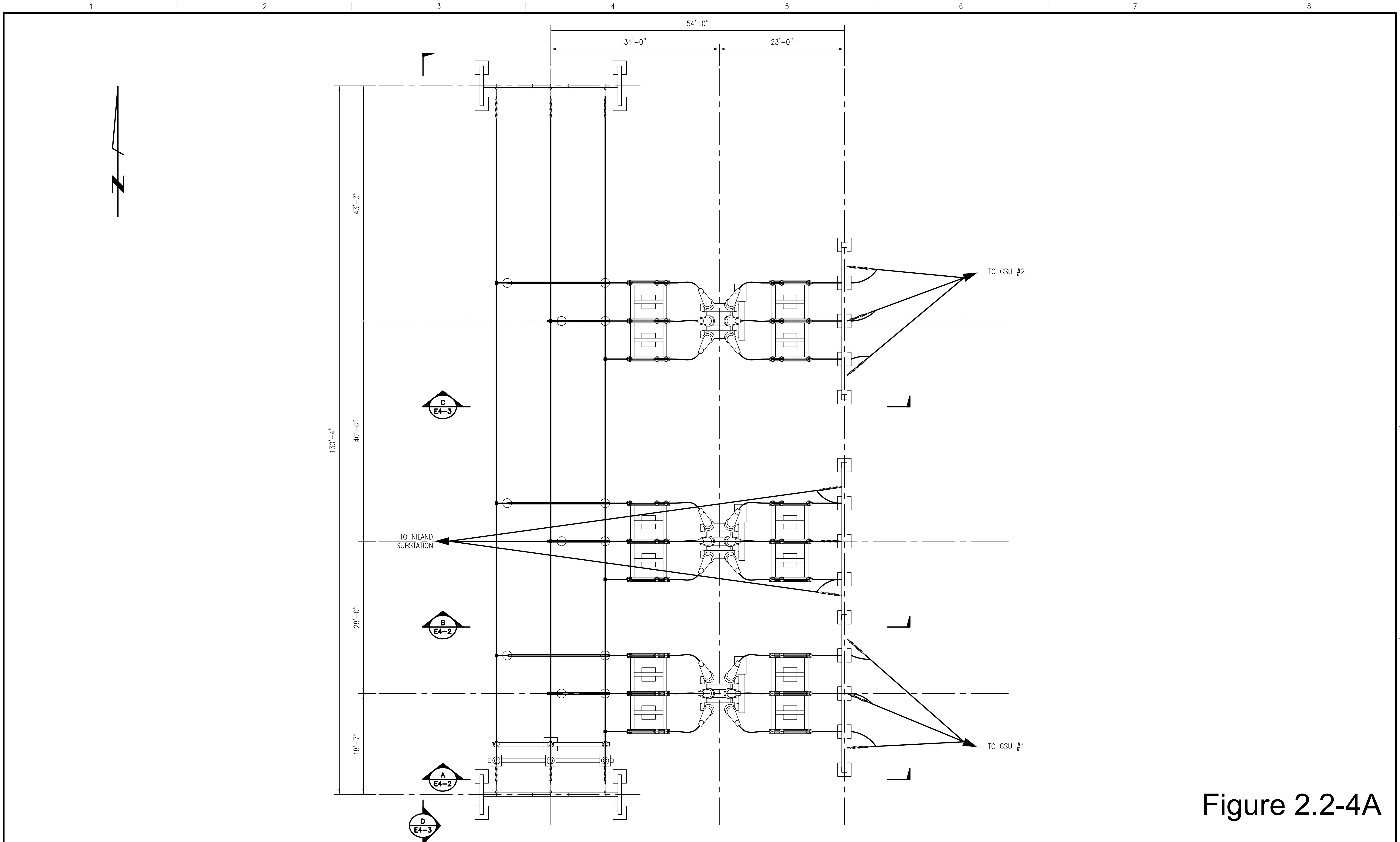


Figure 2.2-4A

27ne4_1.dwg

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
B	REISSUED FOR REVIEW	2/14/06	JM	BT	DEJ	DCT
A	ISSUED FOR REVIEW	12/1/05	JM	BT	DEJ	DCT

REFERENCE DRAWINGS	
E1-0	ONE LINE LEGEND AND SYMBOLS
E4-3	ELEVATIONS SHEET 2
E4-2	ELEVATIONS SHEET 1

DSGN	BT	11/30/05
DRN	JM	11/30/05
CKD	*	*
SCALE:	1/8"=1'-0"	

FOR 22x34 DWG ONLY

POWER ENGINEERS

IMPERIAL IRRIGATION DISTRICT

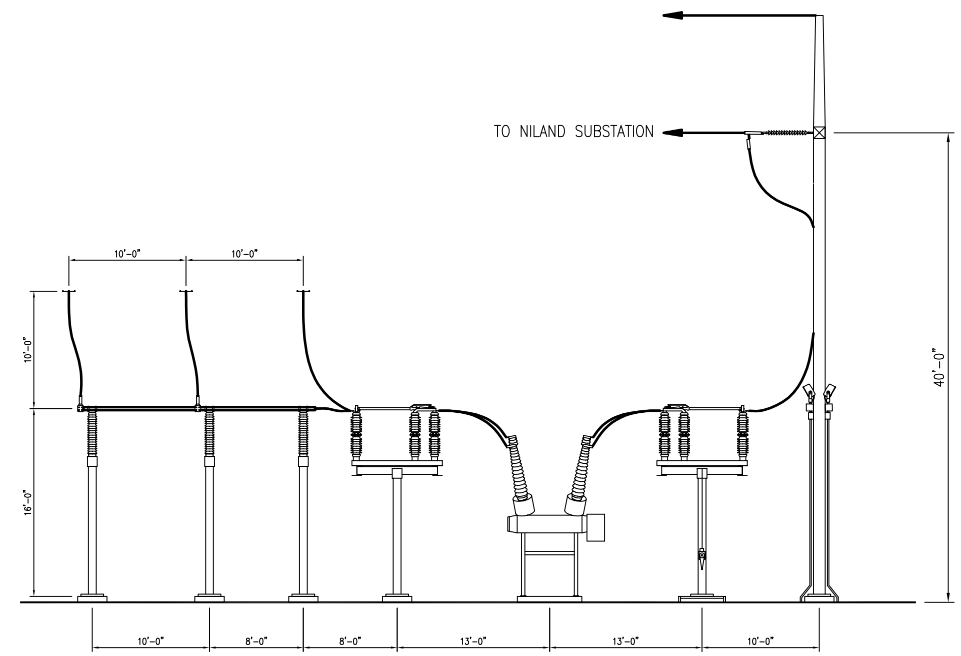
NILAND GAS TURBINE PLANT

GENERATION SWITCHYARD GENERAL ARRANGEMENT

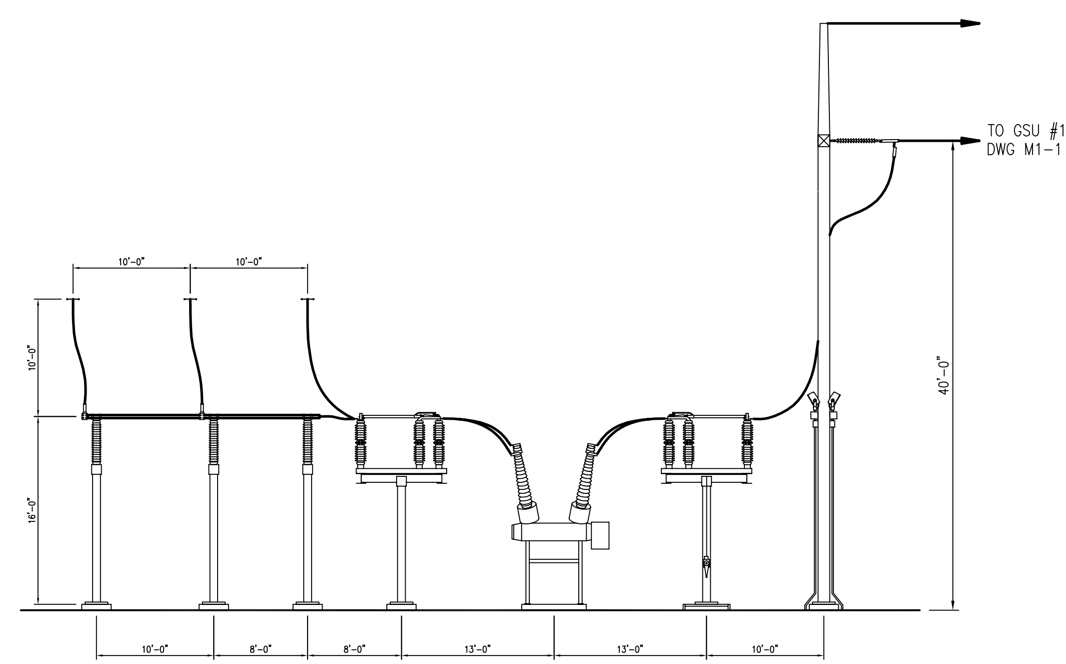
JOB NUMBER 108746

REV B

DRAWING NUMBER E4-1



SECTION B E4-1



SECTION A E4-1

Figure 2.2-4B

27ne4_2.dwg

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REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
B	REISSUED FOR REVIEW	2/14/06	JM	BT	DEJ	DCT
A	ISSUED FOR REVIEW	11/23/05	JM	BT	DEJ	DCT

REFERENCE DRAWINGS	
E1-0	ONE LINE LEGEND AND SYMBOLS
E4-1	GENERAL ARRANGEMENT

DSGN	BT	11/23/05
DRN	JM	11/23/05
CKD	*	*

SCALE: 1/8"=1'-0"

FOR 22x34 DWG ONLY

POWER ENGINEERS

IMPERIAL IRRIGATION DISTRICT

NILAND GAS TURBINE PLANT

GENERATION SWITCHYARD ELEVATIONS SHEET 1

JOB NUMBER 108746

REV B

DRAWING NUMBER E4-2

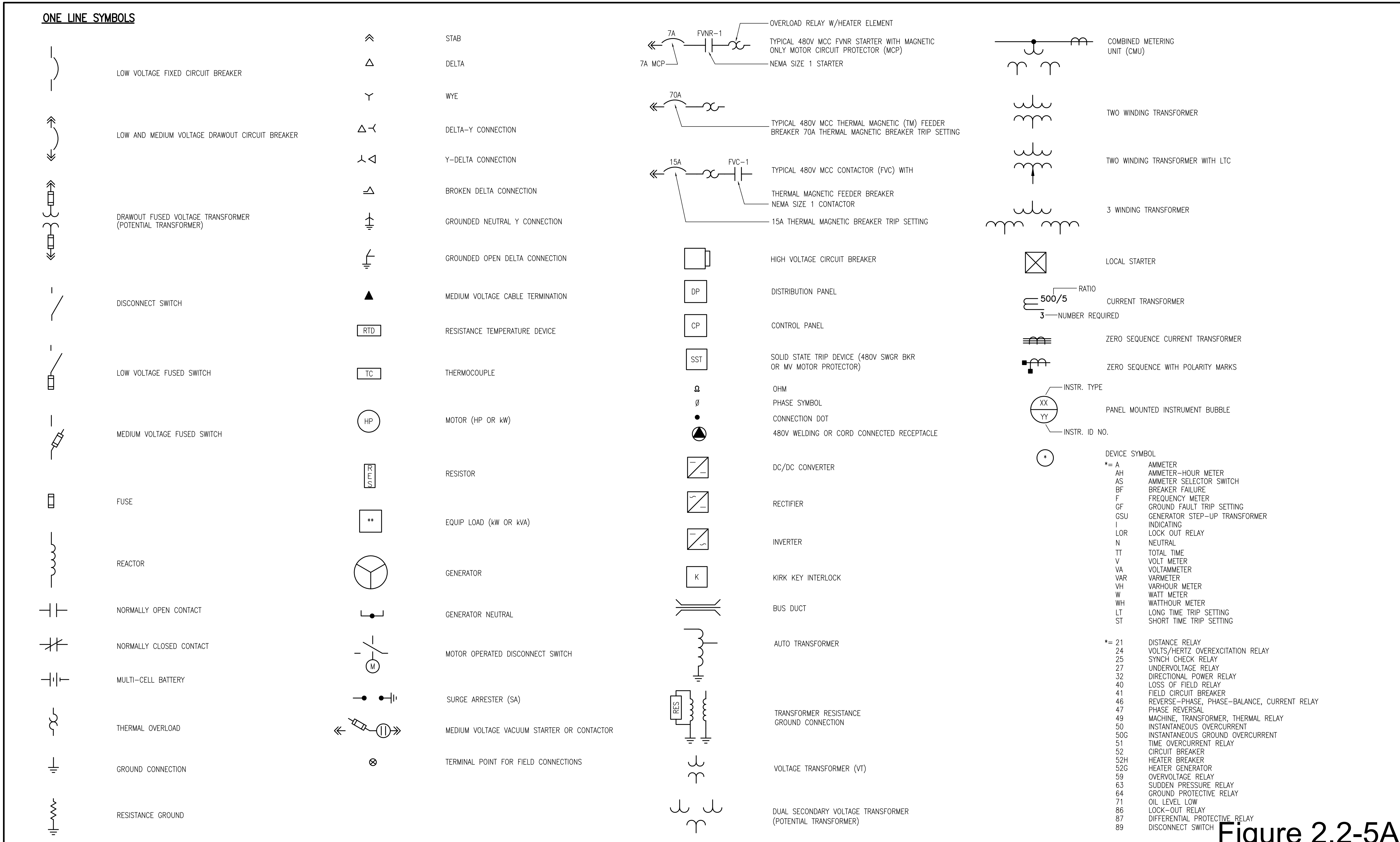


Figure 2.2-5A

58ne1_0.dwg

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
D	ISSUED FOR REVIEW	02-24-06	HJP	LAT	DEJ	DCT
C	ISSUED FOR REVIEW	12-05-05	JMD	LAT	LAT	
B	ISSUED FOR REVIEW	11-22-05	JMD	LAT	LAT	
A	ISSUED FOR REVIEW	11-09-05	JMD	LAT	LAT	*

REFERENCE DRAWINGS	
E1-2	GEN SWYD ELEC KEY ONE LINE DIAG
E1-1	ELECTRICAL ONE LINE DIAGRAM

DSGN	LAT	11-09-05
DRN	JMD	11-09-05
CKD	LAT	11-11-05
SCALE:	NONE	

FOR 22x34 DWG ONLY

POWER ENGINEERS

IMPERIAL IRRIGATION DISTRICT

NILAND GAS TURBINE PLANT

ELECTRICAL KEY ONE LINE DIAGRAM LEGEND AND SYMBOLS

JOB NUMBER 108746

REV D

DRAWING NUMBER E1-0

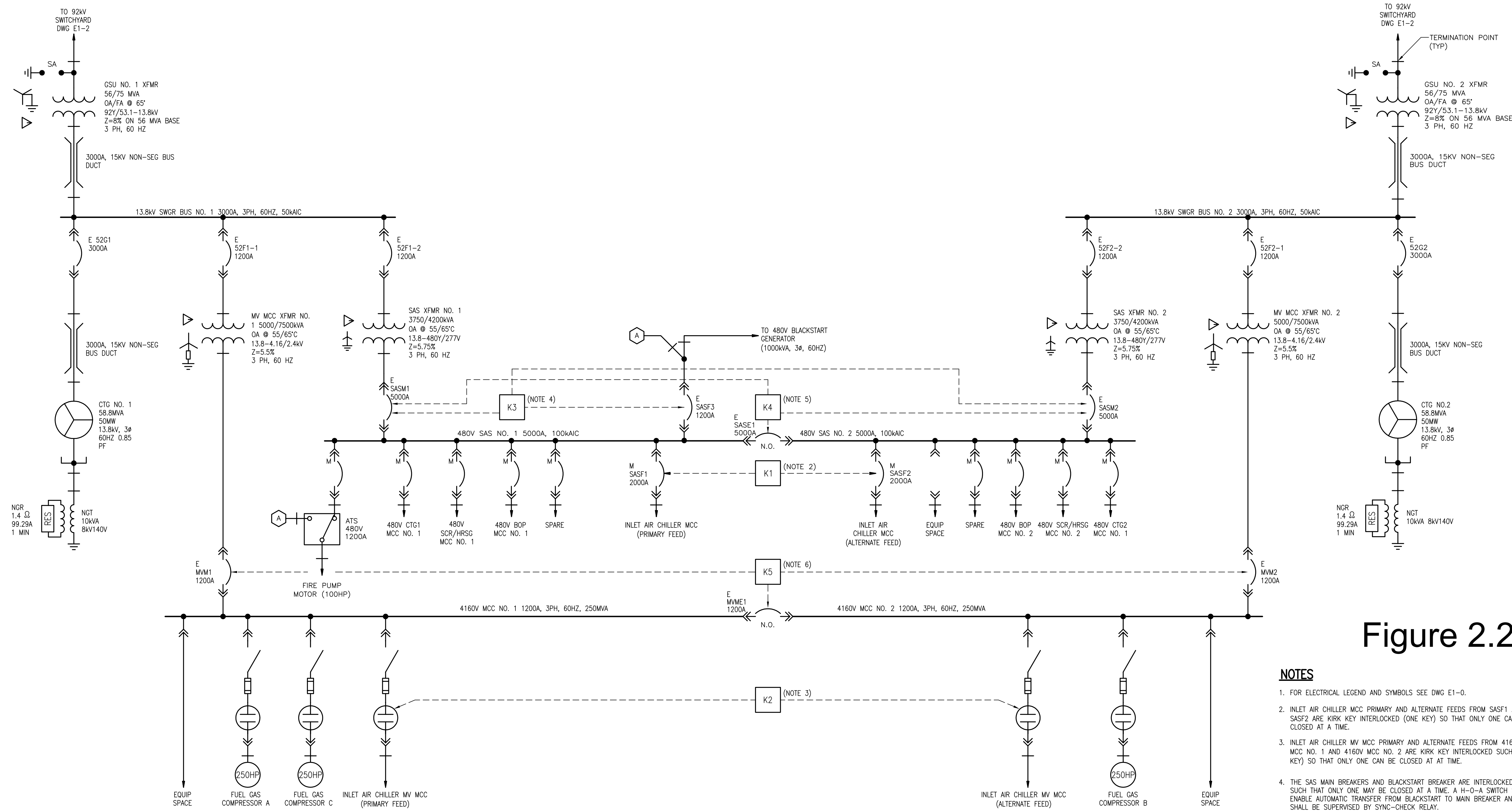


Figure 2.2-5B

NOTES

1. FOR ELECTRICAL LEGEND AND SYMBOLS SEE DWG E1-0.
2. INLET AIR CHILLER MCC PRIMARY AND ALTERNATE FEEDS FROM SASF1 AND SASF2 ARE KIRK KEY INTERLOCKED (ONE KEY) SO THAT ONLY ONE CAN BE CLOSED AT A TIME.
3. INLET AIR CHILLER MV MCC PRIMARY AND ALTERNATE FEEDS FROM 4160V MCC NO. 1 AND 4160V MCC NO. 2 ARE KIRK KEY INTERLOCKED SUCH (ONE KEY) SO THAT ONLY ONE CAN BE CLOSED AT AT TIME.
4. THE SAS MAIN BREAKERS AND BLACKSTART BREAKER ARE INTERLOCKED SUCH THAT ONLY ONE MAY BE CLOSED AT A TIME. A H-O-A SWITCH SHALL ENABLE AUTOMATIC TRANSFER FROM BLACKSTART TO MAIN BREAKER AND SHALL BE SUPERVISED BY SYNC-CHECK RELAY.
5. THE 480V MAIN/TIE BREAKERS ARE ELECTRICALLY INTERLOCKED SUCH THAT ONLY TWO CAN BE CLOSED AT A TIME.
6. THE 4160V MAIN/TIE BREAKERS ARE ELECTRICALLY INTERLOCKED SUCH THAT ONLY TWO CAN BE CLOSED AT A TIME.
7. CT'S & PT'S ARE NOT SHOWN FOR CLARITY.
8. ALL TRANSFORMERS, BUSES, SWITCHBOARDS, MCC, ETC. RATINGS ARE PRELIMINARY. THE ACTUAL RATINGS SHALL BE DETERMINED BY THE EPC CONTRACTOR BASED ON THE ACTUAL EQUIPMENT PROVIDED.

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
D	ISSUED FOR REVIEW	02-24-06	HJP	LAT	DEJ	DCT
C	ISSUED FOR REVIEW	12-05-05	JMD	LAT	LAT	
B	ISSUED FOR REVIEW	11-22-05	JMD	LAT	LAT	
A	ISSUED FOR REVIEW	11-11-05	JMD	LAT	LAT	*

REFERENCE DRAWINGS	
E1-0	ONE LINE LEGEND AND SYMBOLS

DSGN	LAT	11-09-05
DRN	JMD	11-09-05
CKD	LAT	11-11-05
SCALE:	NONE	

FOR 22x34 DWG ONLY

IMPERIAL IRRIGATION DISTRICT

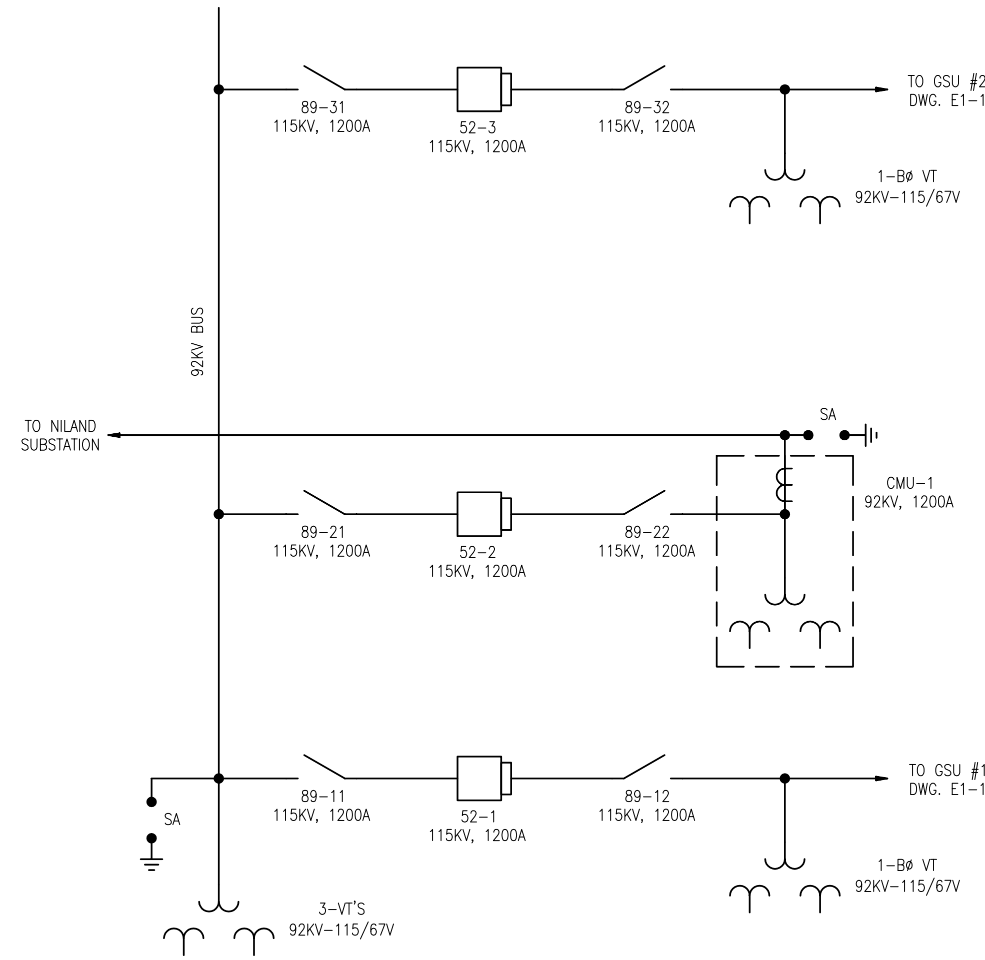
NILAND GAS TURBINE PLANT

ELECTRICAL KEY ONE LINE DIAGRAM

JOB NUMBER 108746

REV D

DRAWING NUMBER E1-1



NOTES:

1. CIRCUIT BREAKER CT'S ARE NOT SHOWN FOR CLARITY.

Figure 2.2-5C

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
B	REISSUED FOR REVIEW	2/14/06	JM	BT	DEJ	DCT
A	ISSUED FOR REVIEW	11/21/05	JM	BT	DEJ	DCT

REFERENCE DRAWINGS	
E1–1	ELECTRICAL ONE LINE DIAGRAM
E1–0	ONE LINE LEGEND AND SYMBOLS

DSGN	BT	11/21/05
DRN	JM	11/21/05
CKD	*	*
SCALE:	NONE	

FOR 22x34 DWG ONLY

IID ENERGY

POWER ENGINEERS

IMPERIAL IRRIGATION DISTRICT

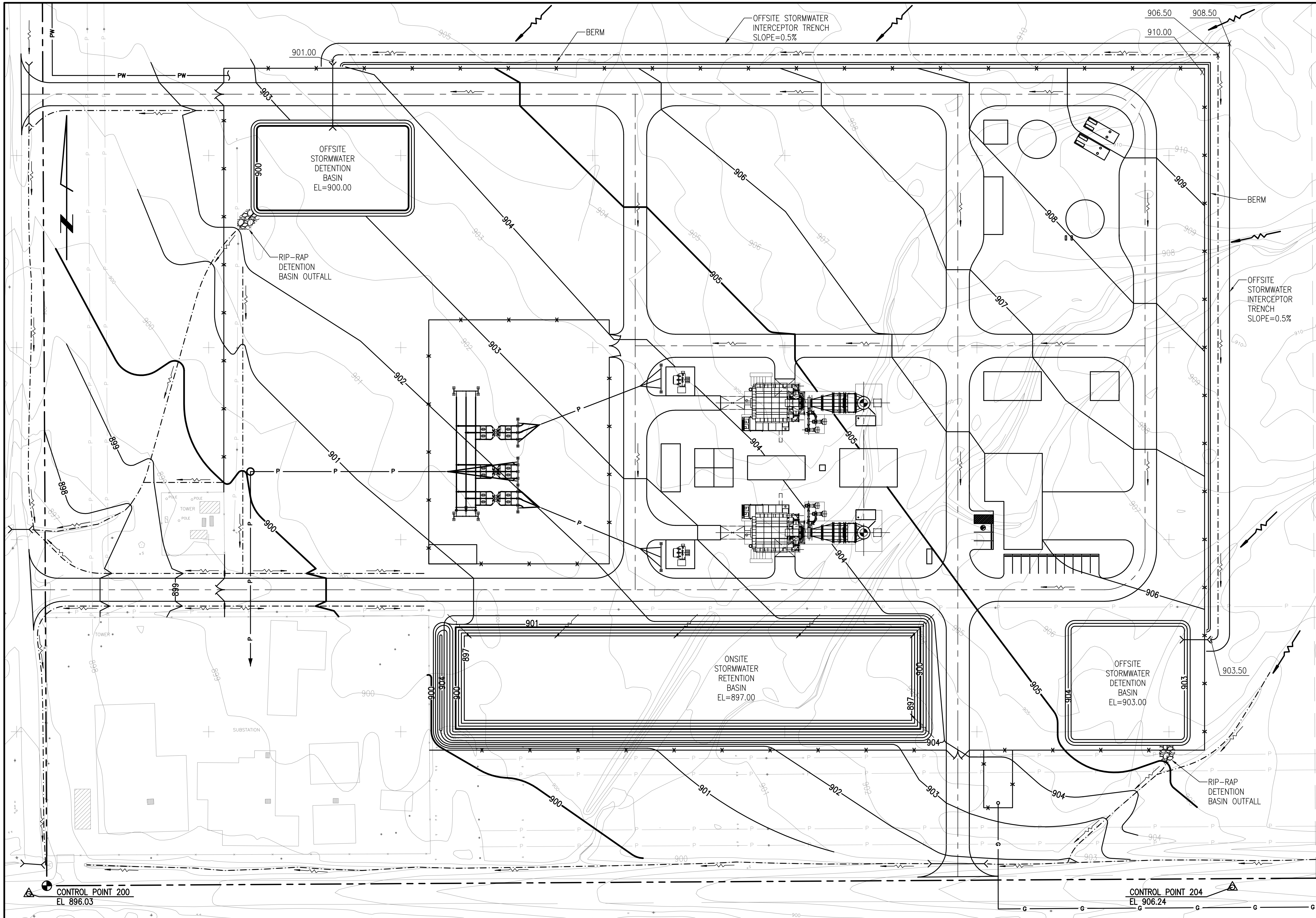
NILAND GAS TURBINE PLANT

GENERATION SWITCHYARD
ELECTRICAL KEY ONE LINE DIAGRAM

JOB NUMBER: 108746

REV: B

DRAWING NUMBER: E1–2



LEGEND

- PROPERTY LINE
- EXISTING OVERHEAD ELECTRICAL LINE
- 900 EXISTING CONTOUR, 1' INTERVAL
- 900 DESIGN CONTOUR, 1' INTERVAL
- DRAINAGE SWALE
- CULVERT
- FLOW DIRECTION
- PW POTABLE WATER LINE
- G GAS LINE
- FENCE
- 900.00 SPOT ELEVATION
- PROPERTY CORNER

NOTES

1. THIS GRADING PLAN IS PRELIMINARY AND INTENDED TO PRESENT A GENERAL GRADING CONCEPT SUFFICIENT FOR PROJECT PERMITTING. THE CONTRACTOR IS RESPONSIBLE FOR PREPARING A FINAL GRADING PLAN IN ACCORDANCE WITH THE IMPERIAL IRRIGATION DISTRICT (IID) "DRAFT" HYDROLOGY MANUAL, AND OBTAINING APPROVAL FROM THE COUNTY ENGINEER.
2. THE CONTRACTOR SHALL PREPARE A DRAINAGE REPORT IN ACCORDANCE WITH COUNTY REQUIREMENTS.
3. SLOPE AWAY FROM CTG, GSU, SLABS-ON GRADE, AND OTHER EQUIPMENT AT MINIMUM 2% FOR 10 FEET. ALL STORMWATER GENERATED ONSITE SHALL BE DIRECTED TO THE ONSITE STORMWATER RETENTION BASIN FOR EVAPORATION AND PERCOLATION. BASIN SHALL RETAIN 5" STORMWATER ACROSS THE PROJECT SITE PER "ENGINEERING DESIGN GUIDELINES MANUAL FOR THE PREPARATION AND CHECKING OF STREET IMPROVEMENT, DRAINAGE AND GRADING PLANS WITHIN IMPERIAL COUNTY."
4. OFFSITE STORMWATER SHALL BE INTERCEPTED BEFORE IT COMES ONSITE AND DIRECTED BY TRENCHES TO STORMWATER DETENTION BASINS. TRENCHES SHALL BE DESIGNED TO ADEQUATELY CARRY THE 100-YEAR 24-HOUR STORM AT A MAXIMUM 0.5% SLOPE. DETENTION BASINS SHALL BE MINIMUM 3 FEET IN DEPTH AND SHALL HAVE RIP-RAP LINED OUTFALLS. INTERCEPTOR TRENCHES AND OUTFALL SWALES SHALL BE RIP-RAPPED OR LINED AS NECESSARY TO PREVENT EROSION AND SEDIMENT TRANSPORT. DETENTION BASINS SHALL BE UNLINED TO PROMOTE INFILTRATION OF STORMWATER.
5. ELEVATIONS ARE BASED UPON NAVD 1988 PLUS 1000' TO AVOID NEGATIVE VALUES.

Figure 2.2-6

53nc2_1.dwg

THIS DRAWING WAS PREPARED BY POWER ENGINEERS, INC. FOR A SPECIFIC PROJECT, TAKING INTO CONSIDERATION THE SPECIFIC AND UNIQUE REQUIREMENTS OF THE PROJECT. REUSE OF THIS DRAWING OR ANY INFORMATION CONTAINED IN THIS DRAWING FOR ANY PURPOSE IS PROHIBITED UNLESS WRITTEN PERMISSION FROM BOTH POWER AND POWER'S CLIENT IS GRANTED.

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
A	ISSUED FOR REVIEW	02/24/06	WMT	WKW	WKW	DEJ

REFERENCE DRAWINGS	
C1-1	SITE PLAN AND UTILITY INTERFACE

DSGN	WKW	10/21/05
DRN	WMT	10/21/05
CKD	WKW	10/21/05
SCALE:	1"= 50'	

FOR 22x34 DWG ONLY

IID ENERGY — POWER ENGINEERS

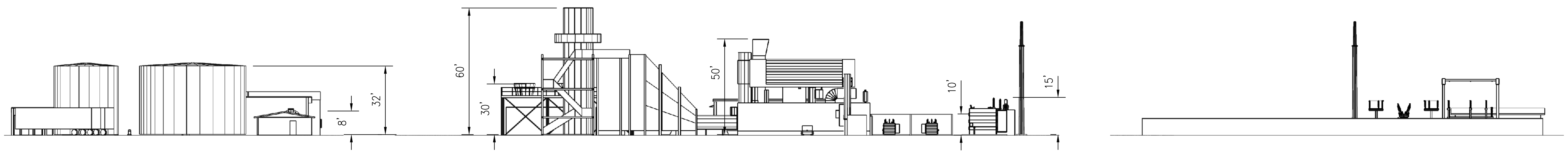
IMPERIAL IRRIGATION DISTRICT

NILAND GAS TURBINE PLANT

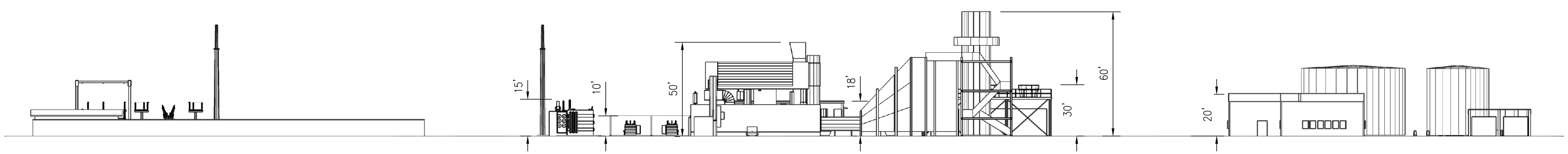
PRELIMINARY GRADING PLAN

JOB NUMBER 108746 — REV A

DRAWING NUMBER C2-1



NORTH ELEVATION



SOUTH ELEVATION

Figure 2.2-7

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
B	ISSUED FOR REVIEW	2/28/06	SDA	PR	DEJ	DCT
A	ISSUED FOR REVIEW	1/18/06	SDA	PR	DEJ	DCT

REFERENCE DRAWINGS

DSGN	PR	1/17/06
DRN	SDA	1/17/06
CKD	DEJ	1/17/06

SCALE: NTS

FOR 22x34 DWG ONLY

IMPERIAL IRRIGATION DISTRICT

NILAND GAS TURBINE PLANT

PLANT ELEVATIONS – NORTH / SOUTH

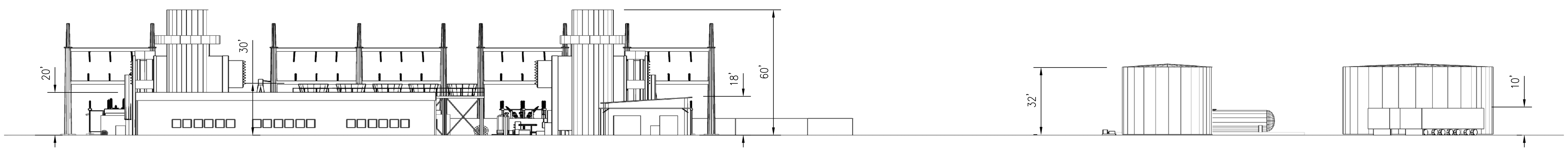
JOB NUMBER 108746

REV B

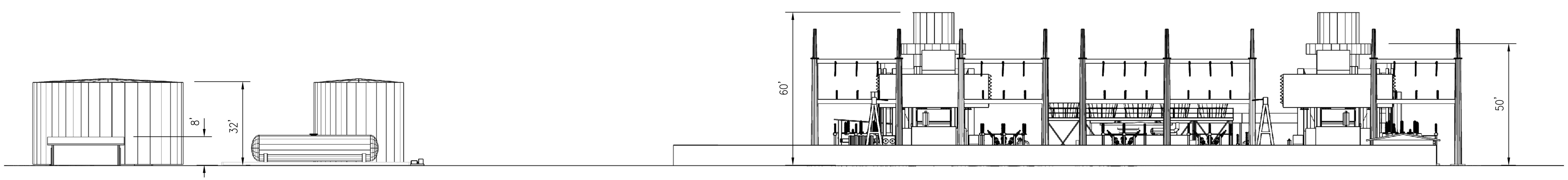
DRAWING NUMBER M4–1

55nm4_1.dgn 2/28/2006 4:03:35 PM

1 2 3 4 5 6 7 8



EAST ELEVATION



WEST ELEVATION

Figure 2.2-8

THIS DRAWING WAS PREPARED BY POWER ENGINEERS, INC. FOR A SPECIFIC PROJECT, TAKING INTO CONSIDERATION THE SPECIFIC AND UNIQUE REQUIREMENTS OF THE PROJECT. REUSE OF THIS DRAWING OR ANY INFORMATION CONTAINED IN THIS DRAWING FOR ANY PURPOSE IS PROHIBITED UNLESS WRITTEN PERMISSION FROM BOTH POWER AND POWER'S CLIENT IS GRANTED.

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
B	ISSUED FOR REVIEW	2/28/06	SDA	PR	DEJ	DCT
A	ISSUED FOR REVIEW	1/18/06	SDA	PR	DEJ	DCT

REFERENCE DRAWINGS

DSGN	PR	1/17/06
DRN	SDA	1/17/06
CKD	DEJ	1/17/06

SCALE: NTS

FOR 22x34 DWG ONLY

IMPERIAL IRRIGATION DISTRICT

NILAND GAS TURBINE PLANT

PLANT ELEVATIONS – EAST / WEST

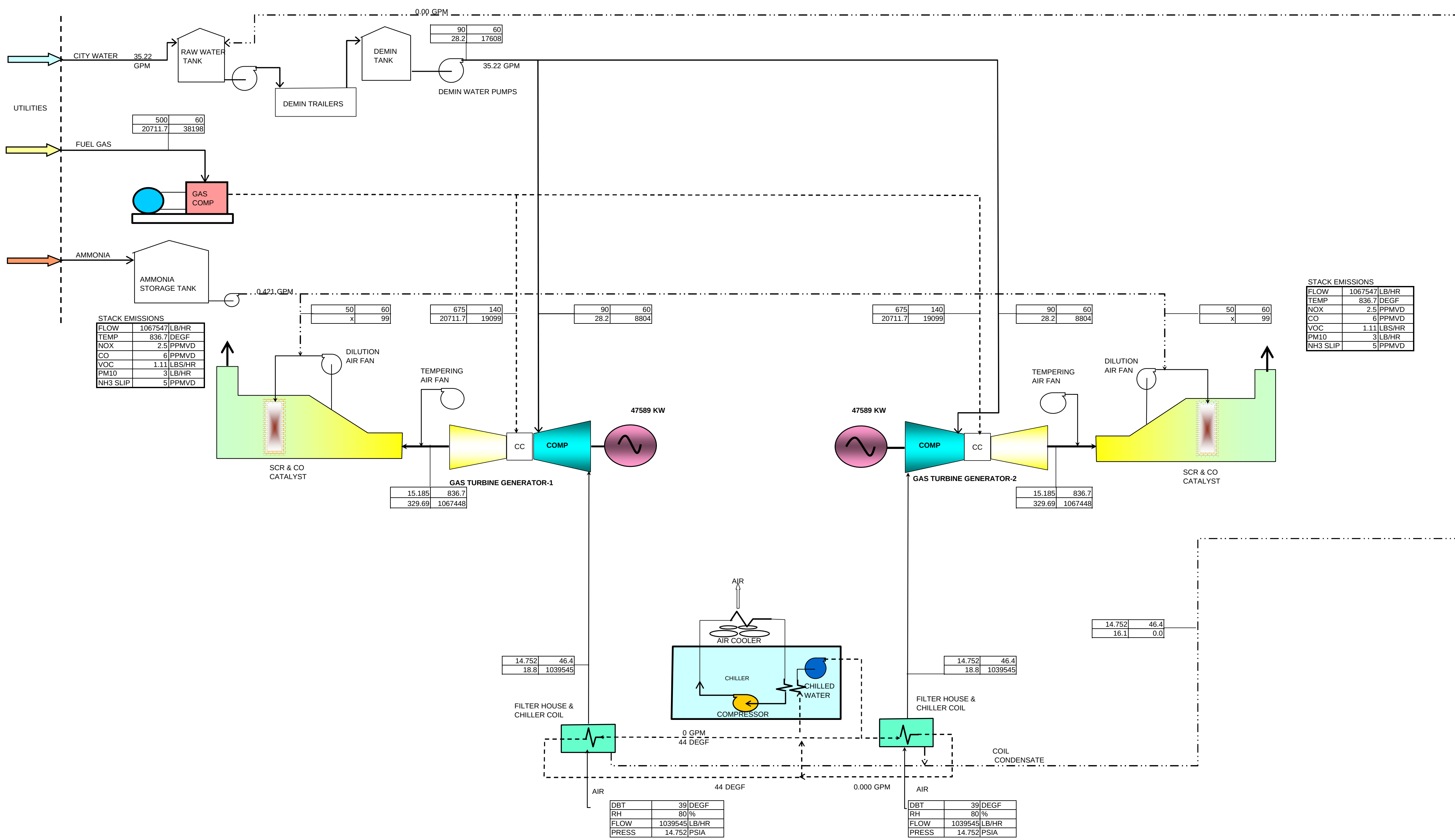
JOB NUMBER 108746

REV B

DRAWING NUMBER M4-2

55nm4_2.dgn 2/28/2006 4:08:27 PM

2XLM6000PD SPRINT ACC @ 39F



NOTES

1. THE SCR TEMPERING AIR FANS OPERATE ONLY WHEN THE FLUE GAS TEMPERATURE IS GREATER THAN 875DEGF
2. ANTI ICEING IS ACHIEVED BY RECIRCULATING COMP VETILATION AIR
3. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 500PSIA
4. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED

WATER CONSUMPTION SUMMARY

RAW WATER TO SITE, GPM	35.22
NOX CONTROL, PER ENGINE, GPM	0.00
POWER AUGMENTATION, PER ENGINE, GPM	17.61
WASTE WATER FROM SITE, GPM	0.00

PARAMETERS

PSIA	^0F
BTU/LB	PPH

PLANT PERFORMANCE SUMMARY-ESTIMATED

GAS TURBINE GROSS OUTPUT , KW/UNIT	47589
NUMBER OF GAS TURBINES	2
TOTAL GROSS OUTPUT, KW	95178
PLANT AUXILIARY LOSSES, KW	1329.54
PLANT NET OUTPUT, KW	93848.46
FUEL INPUT/ UNIT, MMBTU/HR (LHV)	395.6
TOTAL PLANT FUEL INPUT, MMBTU/HR (LHV)	791.2
NET PLANT HEAT RATE, BTU/KWH (LHV)	8430.61
NET PLANT HEAT RATE, BTU/KWH (HHV)	9345.73

REV	DESCRIPTION	MECH	PE	PM	DATE
A	Issured for Review	PR	DEJ	DT	11/21/2005
B	Reissued for Review	PR	DEJ	DT	1/17/2006

REFERENCE DOCUMENTS

1. GE'S APPS VERSION 3.3.0
2. TURBINE AIR SYSTEMS CHILLER PACKAGE
3. IID WATER ANALYSIS DATED 04/10/05
4. SEMPRA GAS ANALYSIS
5. NILAND CLIMATIC INFORMATION

Design Case:

Configuration: 2xLM6000 PD Sprint		Amb. Pressure	14.75 psia
Dry Bulb Temp.:	39.00 deg F	Wet Bulb Temp.:	36.60 deg.F
Total NOx Injection	0.00 gpm	Total Sprint Inj	35.22 gpm

POWER ENGINEERS

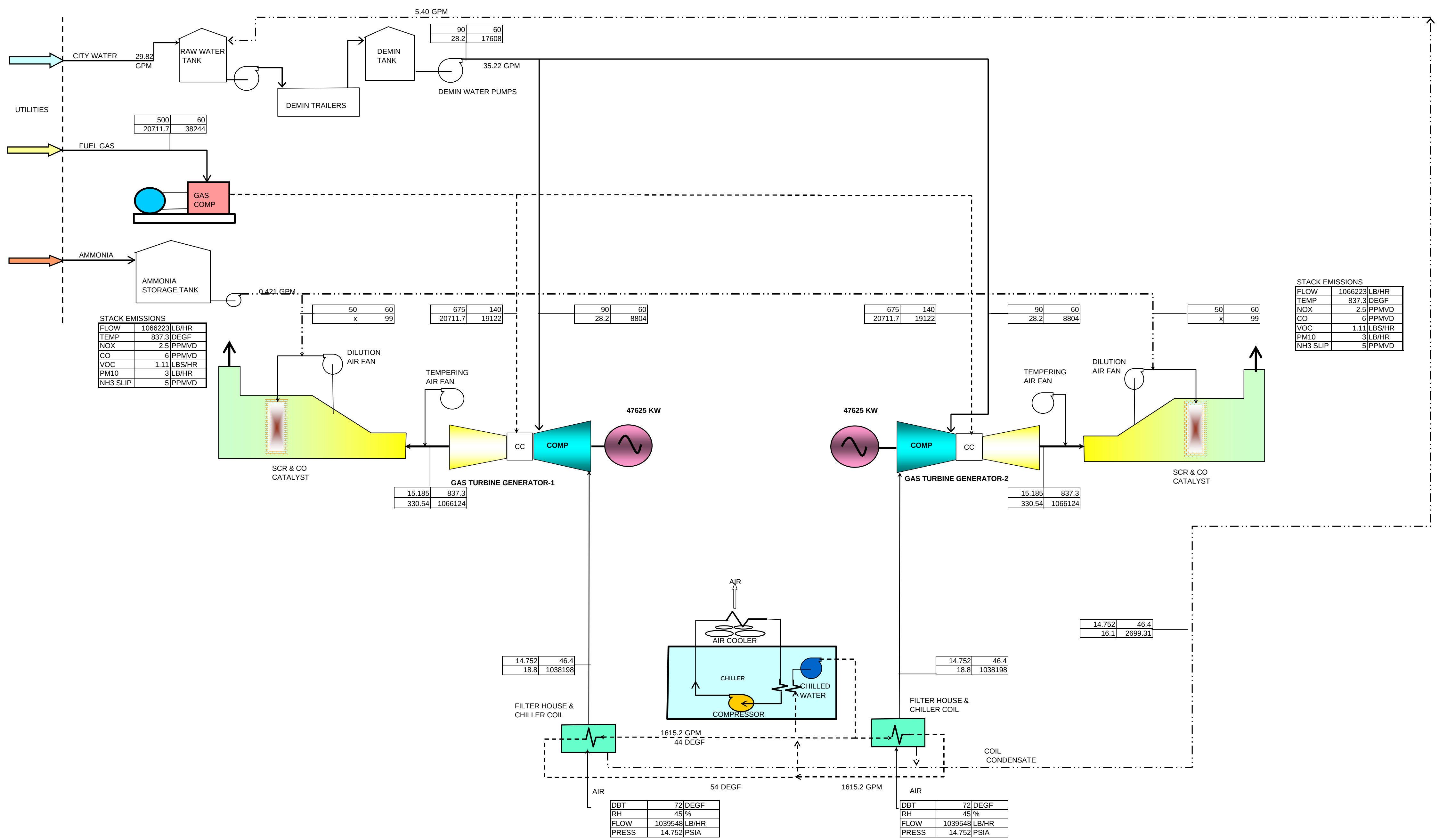
IMPERIAL IRRIGATION DISTRICT
NILAND GAS TURBINE PROJECT

HEAT AND MASS BALANCE DIAGRAM
LM6000PD SPRINT ACC 39F

DRAWING NO:108746/MC/127 — Rev. B

Figure 2.5-1A

2XLM6000 PD SPRINT ACC @72F AMB



NOTES

1. THE SCR TEMPERING AIR FANS OPERATE ONLY WHEN THE FLUE GAS TEMPERATURE IS GREATER THAN 875DEGF
2. CHILLER LOADS ASSUMED FROM TAS PROPOSAL
3. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 500PSIA
4. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED

WATER CONSUMPTION SUMMARY

RAW WATER TO SITE, GPM	29.82
NOX CONTROL, PER ENGINE, GPM	0
POWER AUGMENTATION, PER ENGINE, GPM	17.61
WASTE WATER FROM SITE, GPM	0.00

PARAMETERS

PSIA	°F
BTU/LB	PPH

PLANT PERFORMANCE SUMMARY-ESTIMATED

GAS TURBINE GROSS OUTPUT , KW/UNIT	47625
NUMBER OF GAS TURBINES	2
TOTAL GROSS OUTPUT, KW	95250
PLANT AUXILIARY LOSSES, KW	2459.541
PLANT NET OUTPUT, KW	92790.46
FUEL INPUT/ UNIT, MMBTU/HR (LHV)	396.1
TOTAL PLANT FUEL INPUT, MMBTU/HR (LHV)	792.2
NET PLANT HEAT RATE, BTU/KWH (LHV)	8537.516
NET PLANT HEAT RATE, BTU/KWH (HHV)	9464.24

REV	DESCRIPTION	MECH	PE	PM	DATE
A	Issured for Review	PR	DEJ	DT	11/21/2005
B	Reissued for Review	PR	DEJ	DT	1/17/2006

REFERENCE DOCUMENTS

1. GE'S APPS VERSION 3.3.0
2. TURBINE AIR SYSTEMS CHILLER PACKAGE
3. IID WATER ANALYSIS DATED 04/10/05
4. SEMPRA GAS ANALYSIS
5. NILAND CLIMATIC INFORMATION

Design Case:

Configuration:2xLM6000 PD Sprint		Amb. Pressure	14.75 psia
Dry Bulb Temp.:	72.00 deg F	Wet Bulb Temp.:	58.70 deg.F
Total NOx Injection	0.00 gpm	Total Sprint Inj	35.22 gpm

POWER ENGINEERS

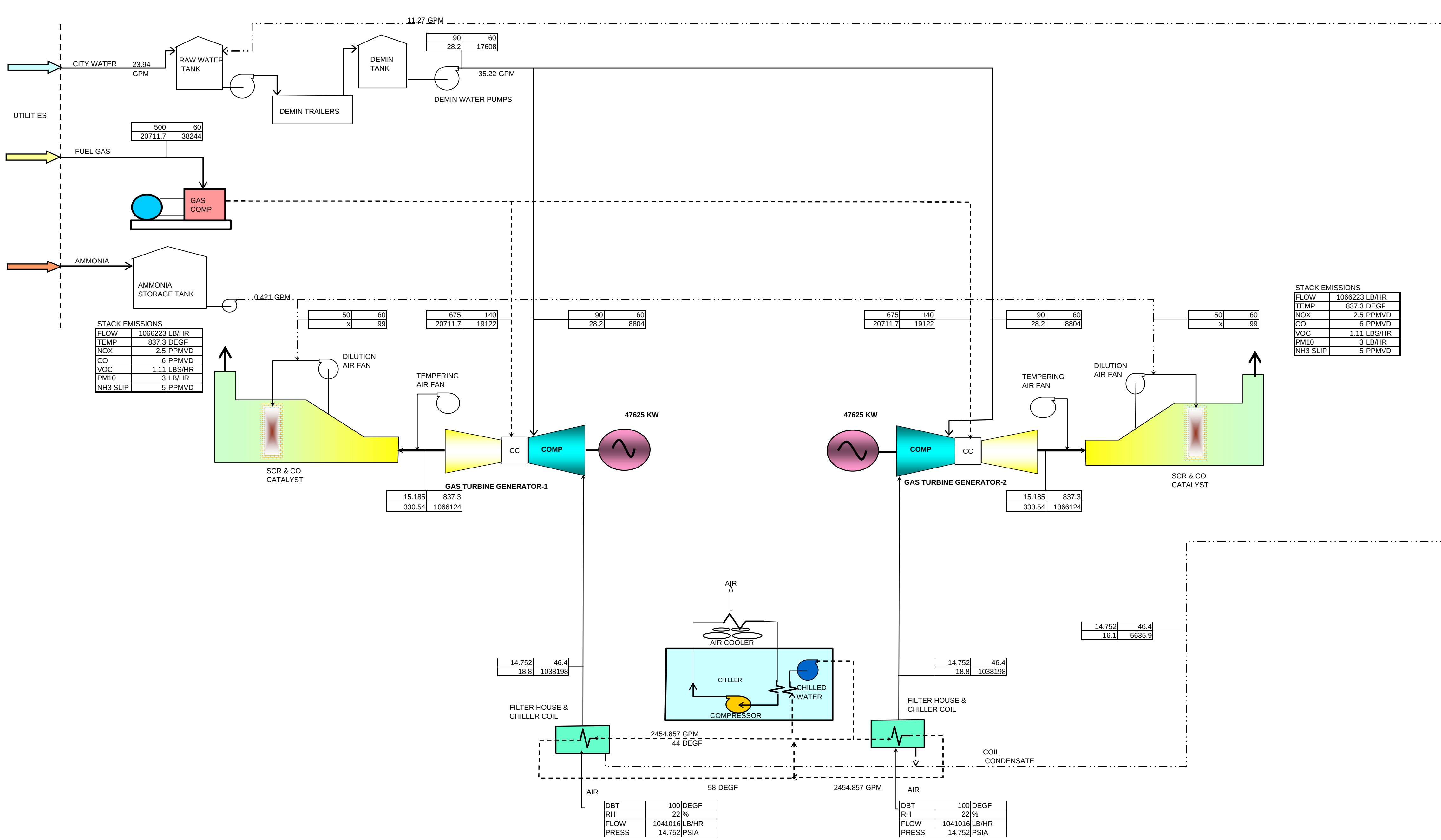
IMPERIAL IRRIGATION DISTRICT
NILAND GAS TURBINE PROJECT

HEAT AND MASS BALANCE DIAGRAM
LM6000PD SPRINT ACC 72F

DRAWING NO:108746/MC/124 Rev. B

Figure 2.5-1B

2XLM6000PD SPRINT ACC @100F AMB



NOTES

1. THE SCR TEMPERING AIR FANS OPERATE ONLY WHEN THE FLUE GAS TEMPERATURE IS GREATER THAN 875DEGF
2. CHILLER LOADS ASSUMED FROM TAS PROPOSAL
3. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 500PSIA
4. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED

WATER CONSUMPTION SUMMARY

RAW WATER TO SITE, GPM	23.94
NOX CONTROL, PER ENGINE, GPM	0.00
POWER AUGMENTATION, PER ENGINE, GPM	17.61
WASTE WATER FROM SITE, GPM	0.00

PARAMETERS

PSIA	°F
BTU/LB	PPH

PLANT PERFORMANCE SUMMARY-ESTIMATED

GAS TURBINE GROSS OUTPUT , KW/UNIT	47625
NUMBER OF GAS TURBINES	2
TOTAL GROSS OUTPUT, KW	95250
PLANT AUXILIARY LOSSES, KW	5319.541
PLANT NET OUTPUT, KW	89930.46
FUEL INPUT/ UNIT, MMBTU/HR (LHV)	396.1
TOTAL PLANT FUEL INPUT, MMBTU/HR (LHV)	792.2
NET PLANT HEAT RATE, BTU/KWH (LHV)	8809.029
NET PLANT HEAT RATE, BTU/KWH (HHV)	9765.225

REV	DESCRIPTION	MECH	PE	PM	DATE
A	Issured for Review	PR	DEJ	DT	11/21/2005
B	Reissued for Review	PR	DEJ	DT	1/17/2006

REFERENCE DOCUMENTS

1. GE'S APPS VERSION 3.3.0
2. TURBINE AIR SYSTEMS CHILLER PACKAGE
3. IID WATER ANALYSIS DATED 04/10/05
4. SEMPRA GAS ANALYSIS
5. NILAND CLIMATIC INFORMATION

Design Case:

Configuration:2xLM6000 PD Sprint		Amb. Pressure	14.75 psia
Dry Bulb Temp.:	100.00 deg F	Wet Bulb Temp.:	70.20 deg.F
Total NOx Injection	0.00 gpm	Total Sprint Inj	35.22 gpm

POWER ENGINEERS

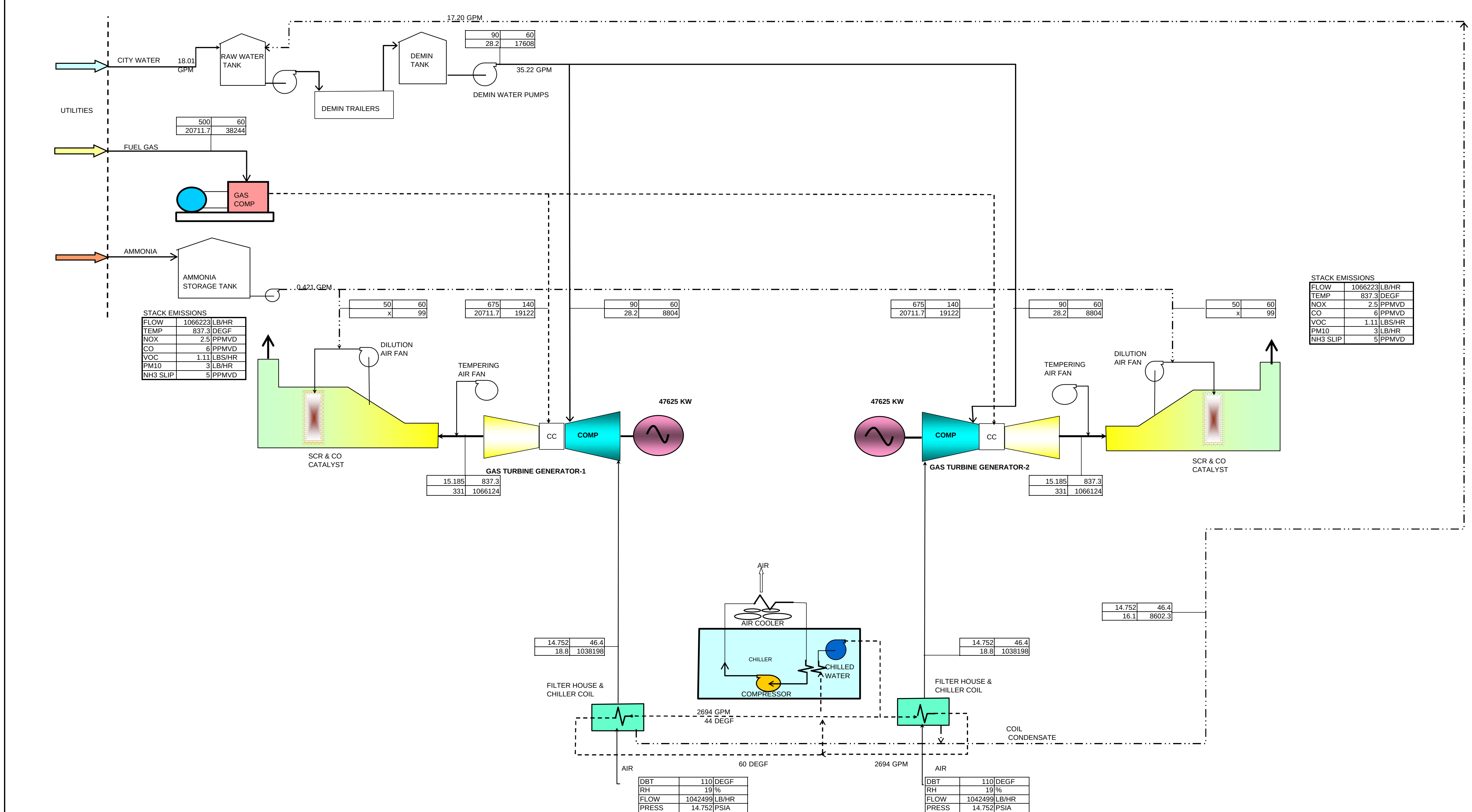
IMPERIAL IRRIGATION DISTRICT
NILAND GAS TURBINE PROJECT

HEAT AND MASS BALANCE DIAGRAM
LM6000PD SPRINT ACC 100F

DRAWING NO:108746/MC/123 Rev. B

Figure 2.5-1C

2XLM6000PD SPRINT ACC @110 AMB



NOTES

1. THE SCR TEMPERING AIR FANS OPERATE ONLY WHEN THE FLUE GAS TEMPERATURE IS GREATER THAN 875DEGF

2. CHILLER LOADS ASSUMED FROM TAS PROPOSAL

3. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 500PSIA

4. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED

WATER CONSUMPTION SUMMARY

RAW WATER TO SITE, GPM	18.01
NOX CONTROL, PER ENGINE, GPM	0.00
POWER AUGMENTATION, PER ENGINE, GPM	17.61
WASTE WATER FROM SITE, GPM	0.00

PARAMETERS

PSIA	°F
BTU/LB	PPH

PLANT PERFORMANCE SUMMARY-ESTIMATED

GAS TURBINE GROSS OUTPUT , KW/UNIT	47625
NUMBER OF GAS TURBINES	2
TOTAL GROSS OUTPUT, KW	95250
PLANT AUXILIARY LOSSES, KW	7059.541
PLANT NET OUTPUT, KW	88190.46
FUEL INPUT/ UNIT, MMBTU/HR (LHV)	396.1
TOTAL PLANT FUEL INPUT, MMBTU/HR (LHV)	792.2
NET PLANT HEAT RATE, BTU/KWH (LHV)	8982.831
NET PLANT HEAT RATE, BTU/KWH (HHV)	9957.894

REV	DESCRIPTION	MECH	PE	PM	DATE
A	Issured for Review	PR	DEJ	DT	11/21/2005
B	Reissued for Review	PR	DEJ	DT	1/17/2006

REFERENCE DOCUMENTS

1. GE'S APPS VERSION 3.3.0
2. TURBINE AIR SYSTEMS CHILLER PACKAGE
3. IID WATER ANALYSIS DATED 04/10/05
4. SEMPRA GAS ANALYSIS
5. NILAND CLIMATIC INFORMATION

Design Case:

Configuration:2xLM6000 PD Sprint		Amb. Pressure	14.75 psia
Dry Bulb Temp.:	110.00 deg F	Wet Bulb Temp.:	74.80 deg.F
Total NOx Injection	0.00 gpm	Total Sprint Inj	35.22 gpm

POWER ENGINEERS

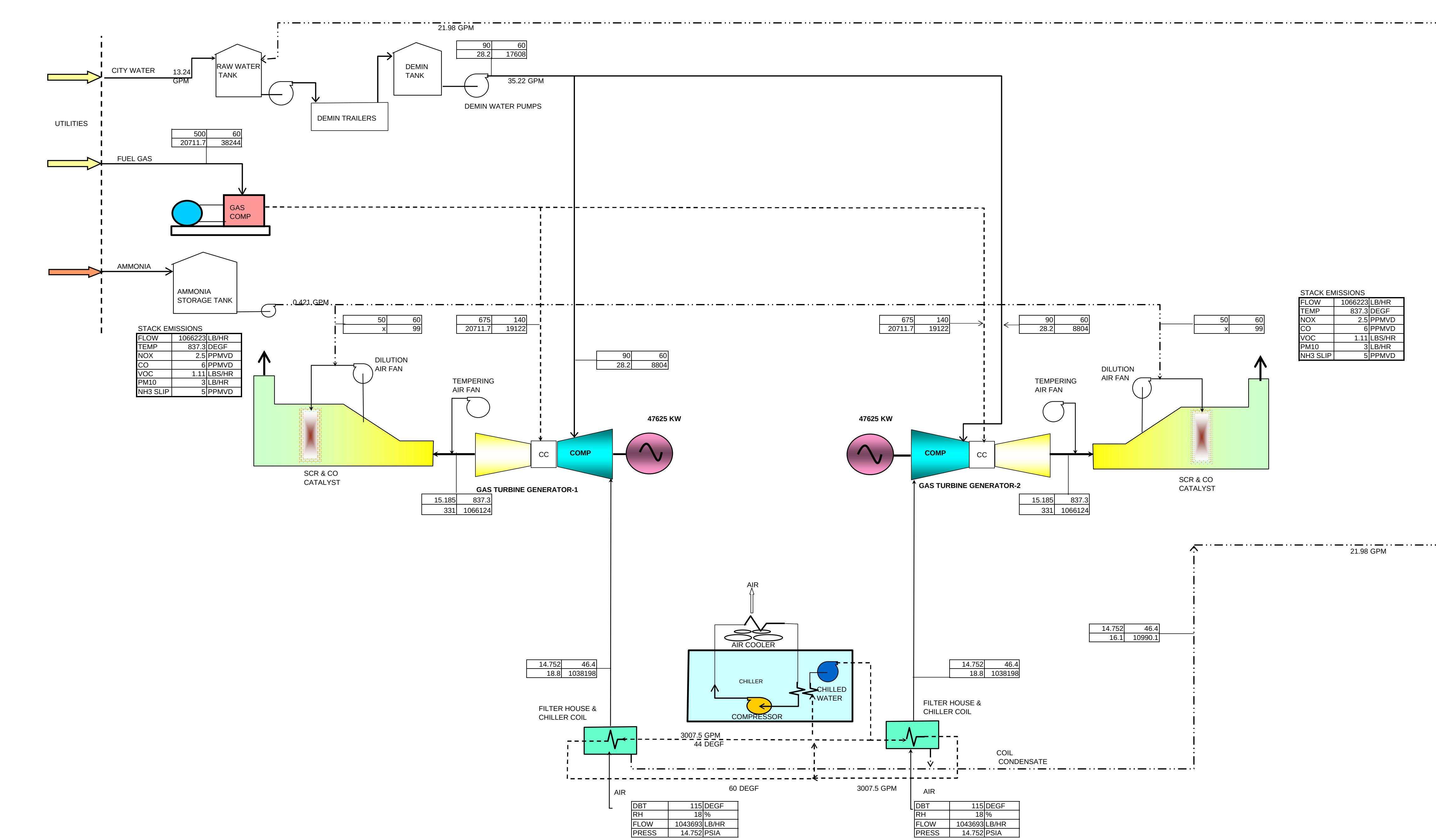
IMPERIAL IRRIGATION DISTRICT
NILAND GAS TURBINE PROJECT

HEAT AND MASS BALANCE DIAGRAM
LM6000PD SPRINT ACC 110F

DRAWING NO:108746/MC/122 Rev. B

Figure 2.5-1D

2XLM6000PD SPRINT ACC @115 AMB



NOTES

1. THE SCR TEMPERING AIR FANS OPERATE ONLY WHEN THE FLUE GAS TEMPERATURE IS GREATER THAN 875DEGF
2. CHILLER LOADS ASSUMED FROM TAS PROPOSAL
3. FUEL GAS SUPPLY PRESSURE TO SITE IS ASSUMED AT 500PSIA
4. GAS TURBINE LUBE OIL COOLERS WILL BE AIR COOLED

WATER CONSUMPTION SUMMARY

RAW WATER TO SITE, GPM	13.24
NOX CONTROL, PER ENGINE, GPM	0.00
POWER AUGMENTATION, PER ENGINE, GPM	17.61
WASTE WATER FROM SITE, GPM	0.00

PARAMETERS

PSIA	°F
BTU/LB	PPH

PLANT PERFORMANCE SUMMARY-ESTIMATED

GAS TURBINE GROSS OUTPUT , KW/UNIT	47625
NUMBER OF GAS TURBINES	2
TOTAL GROSS OUTPUT, KW	95250
PLANT AUXILIARY LOSSES, KW	8179.541
PLANT NET OUTPUT, KW	87070.46
FUEL INPUT/ UNIT, MMBTU/HR (LHV)	396.1
TOTAL PLANT FUEL INPUT, MMBTU/HR (LHV)	792.2
NET PLANT HEAT RATE, BTU/KWH (LHV)	9098.379
NET PLANT HEAT RATE, BTU/KWH (HHV)	10085.98

REV	DESCRIPTION	MECH	PE	PM	DATE
A	Issured for Review	PR	DEJ	DT	11/21/2005
B	Reissued for Review	PR	DEJ	DT	1/17/2006

REFERENCE DOCUMENTS

1. GE'S APPS VERSION 3.3.0
2. TURBINE AIR SYSTEMS CHILLER PACKAGE
3. IID WATER ANALYSIS DATED 04/10/05
4. SEMPRA GAS ANALYSIS
5. NILAND CLIMATIC INFORMATION

Design Case:

Configuration:2xLM6000 PD Sprint		Amb. Pressure	14.75 psia
Dry Bulb Temp.:	115.00 deg F	Wet Bulb Temp.:	77.30 deg.F
Total NOx Injection	0.00 gpm	Total Sprint Inj	35.22 gpm

POWER ENGINEERS

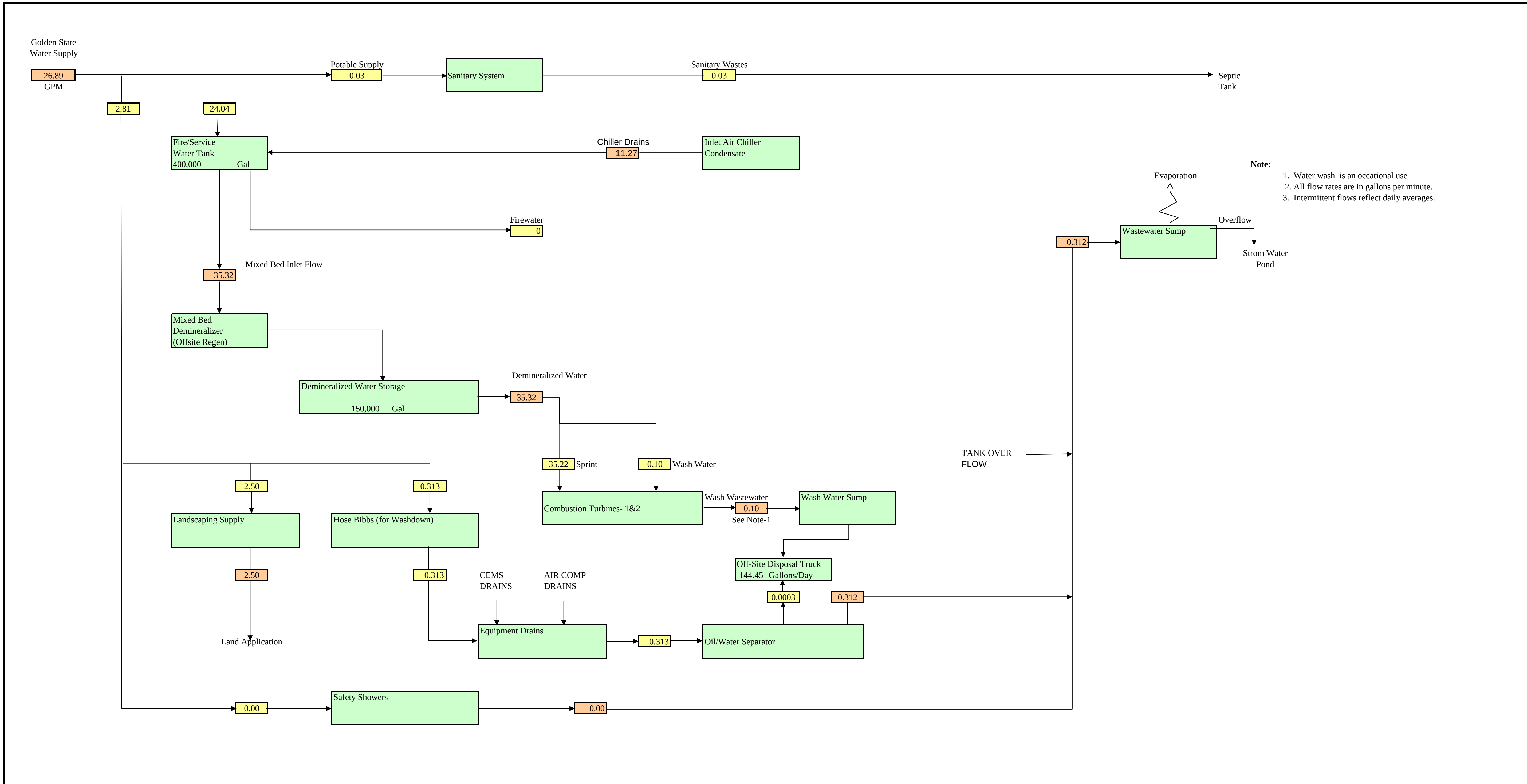
IMPERIAL IRRIGATION DISTRICT
NILAND GAS TURBINE PROJECT

HEAT AND MASS BALANCE DIAGRAM
LM6000PD SPRINT ACC 115F

DRAWING NO:108746/MC/121 Rev. B

Figure 2.5-1E

WATER BALANCE SUMMER CONDITIONS



REV	DESCRIPTION	MECH	PE	PM	DATE	REFERENCE DOCUMENTS
A		PR	DEJ	DCT	1/11/2006	1. GE'S APPS VERSION 3.3.0
B		PR	DEJ	DCT	2/28/2006	2. HEAT AND MASS BALANCE CALCULATIONS

Design Case:

1. 2x LM6000 PD SPRINT BASED LOAD
2. 100DEG F AMBIENT TEMP
3. NO FIRE WATER PUMP DEMAND
4. WATER USE BASED ON NORMAL DEMANDS

POWER ENGINEERS

IMPERIAL IRRIGATION DISTRICT
NILAND GAS TURBINE PROJECT

WATER BALANCE DIAGRAM
LM6000PD SPRINT WITH ACC, AT 100F

DRAWING NO:108746/MC/128 | Rev. B

Figure 2.7-1